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ENGINEER MANUAL

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ENGINEERING AND DESIGN

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LAUNDRY, DRYCLEANING, AND FOOD-SERVICE FACILITIES - EMERGENCY CONSTRUCTION



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HEADQUARTERS, DEPARTMENT OF THE OFFICE OF THE CHIEF OF ENGINEERS

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DEPARTMENT OF THE ARMY
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No. 1110-3-565

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ENGINEERING AND DESIGN

LAUNDRY, DRYCLEANING, AND FOOD-SERVICE
FACILITIES — EMERGENCY CONSTRUCTION

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This manual rescinds Engineering Manual for Emergency Construction, Chapter XVI, January 1951 (EM 1110-345-565).

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APPENDIX I	LAUNDRY-EQUIPMENT SCHEDULE
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SECTION I - PURPOSE AND SCOPE

1-01. PURPOSE AND SCOPE. This manual prescribes the standards of emergency construction to be used by all elements of the Corps of Engineers for the design of laundries, drycleaning plants, and food-service facilities. These requirements may be altered when necessary to meet special conditions on the basis of good engineering practice consistent with the temporary nature of the construction.

SECTION II - LAUNDRIES AND DRYCLEANING PLANTS

2-01. **RESPONSIBILITY FOR TECHNICAL CONTROL.** Army Regulation 210-130 places the responsibility for technical control under the Chief, Support Services, Department of the Army. Technical control of operations includes the formulation of policies, the establishment of prices, and the authority to issue instructions covering the utilization of equipment, plant methods, plant layouts, supply allowances, and procedures and directives concerning standards for quality of the work performed and service to patrons.

2-02. **GENERAL.** The laundries and drycleaning plants are provided with facilities to serve enlisted personnel, officers, authorized patrons, and at some installations, civilian employees, and to handle Government-owned bulk work. Consideration will always be given in the field to location of buildings with reference to similar types of buildings and to the central steam plant. Capacities are based on station complement and on 40 hours operation per week. The capacities can be increased approximately 80 percent by operating the plant 80 hours or two shifts per week. Design will conform to the National Board of Fire Underwriters, Standard No.32, Dry Cleaning Plants.

2-03. **LAYOUT OF MACHINERY.** The various departments will be so arranged that work can pass directly through the plants without backtracking. Space will be restricted for the purpose of reducing distances in transporting the work from one process to another.

a. **Laundries.** The general layout of machinery will be such that bundles containing soiled clothes are received in one end of the building and finished laundry delivered at the opposite end.

b. **Drycleaning Plants.** Drycleaning plants will be rectangular in shape. Space will be required outside of buildings for solvent-storage tank.

2-04. **WORKLOAD STATISTICS.** Because of the variation in types of clothing issued in various climates, varying degrees of efficiency in the utilization of equipment, and differing plant methods, the

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quantities of clothing and time required for processing are not fixed; therefore, the capacities are variable.

a. Quantities of Work. The pounds of laundry and drycleaning work per person or patient per week including station complement for the various weather zones are as follows:

	<u>Frigid</u>	<u>Temperate</u>	<u>Tropical</u>
Troop laundries	14.4	15	15
Hospital laundries	71	71	71
Troop drycleaning plants	4	2-1/2	3/4

b. Workload per Plant. The workload for laundries and drycleaning plants can normally be expected to average 60 percent of the station strength; however, in case of hospital laundries, the workload would be 100 percent of patient strength. Poundage per hospital patient in paragraph 2-04a above includes expected workload of hospital station complement.

c. Workload for Various Departments. The workloads assigned to various departments of the laundry stated in percentage of total loads are as follows:

Rough dry (tumblers)..... 26 percent
Flatwork 46 percent
Pressing 28 percent
Shirts per man per week..... 2-1/2 each

d. Production Standards. Production standards per hour for machinery furnished by the Support Services, Department of the Army are as follows:

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<u>Equipment</u>	<u>Unit</u>	<u>Laun-</u>	<u>Dry-</u>
		<u>dries</u>	<u>cleaning</u>
Marking machine	Bundles per machine	14	--
Washers	Loads per machine	1	1.33
Extractors:			
Regular	Loads per machine	2-1/2	2-1/2
Unloading	Loads per machine	3-1/2	--
Tumblers	Loads per machine	2	2
Shirt unit; cabinet-type:			
2 operators	Pieces	80	--
Coat unit			
1 operator	Pieces	70	--
2 operators	Pieces	120	--
Trouser unit			
1 operator	Pieces - Khaki	45	--
	- fatigue-C&B	55	--
Utility presses	Pieces	--	30
Flatwork ironers:			
8 rolls, w/o automatic			
folders	Sheets	575	--
8 rolls, w/folders, con-			
veyors, and conditioning	Sheets	700	--
tumblers.			
8 rolls, w/automatic			
folders only	Sheets	675	--
6 rolls	Sheets	400	--
Paper-measuring and			
-cutting machine, Wrap-	Bundles	100	--
o-matic type			

2-05. SUPPLY OF LAUNDRY AND DRYCLEANING EQUIPMENT. Laundry and drycleaning equipment is furnished by the Support Services, Department of the Army. The following tables show item numbers and quantities of machines for various plant sizes:

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Table I - Laundries -- Hospital

Item No.	Item	1,000-bed hospital	1,500-bed hospital	2,000-bed hospital
L-3	Board, ironing, laundry-type, with electric iron	1	1	1
L-7-1	Cooker, starch, 50-gallon	1	1	1
L-13	Extractor, laundry, 17"	1	1	1
L-13-3	Extractor, laundry, 30"	2	2	2
L-13-8	Extractor, laundry, 60", unloading	1	2	3
L-15	Form, hosiery, rotary	1	1	1
L-19-2	Ironer, flatwork, 8-roll, 120"	1	2	3
L-23	Machine, folding, laundry, large-piece, automatic-adjusting, single-lane	1	1	2
L-25	Machine, bundle-tying	1	2	2
L-27-2	Machine, marking, laundry, air-operated, 8-character	2	3	3
L-29-3	Machine, sewing, general-purpose, motor-operated	1	1	1
L-29-2	Machine, sewing, button, motor-operated	1	1	1
L-33	Press, handkerchief, 20"	1	1	1
L-35	Press unit, shirt-finishing, 2-operator, cabinet-type, each unit consisting of:	1	2	2

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Table I - Laundries -- Hospital - continued

Item No.	Item	1,000-bed hospital	1,500-bed hospital	2,000-bed hospital
L-35-1	1 Press, shirt body-bosom, cabinet-type, air-operated	--	--	--
L-35-2	1 Press, shirt-sleeve, cabinet-type, air-operated	--	--	--
L-35-3	1 Press, shirt-yoke and shoulder-finishing, air-operated	--	--	--
L-35-4	1 Press, shirt-collar-and-cuff finishing, air-operated	--	--	--
L-35-5	1 Machine, automatic shirt folding	--	--	--
L-41	Press unit, utility, air-operated, each unit consisting of:	3	5	7
L-41-1	1 Press, laundry, garment 54"	--	--	--
L-41-2	2 Presses, laundry, mushroom	--	--	--
L-42	Press unit, trouser-finishing, 1-operator, air-operated, each unit consisting of:	2	3	4
L-42-1	3 Presses, laundry, garment, 53" x 18" x 13"	--	--	--

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Table I - Laundries -- Hospital - continued

Item No.	Item	1,000-bed hospital	1,500-bed hospital	2,000-bed hospital
L-47	Press unit, coat-finishing, 2-operator, cabinet- or rotary-type, component presses determined by type of unit.	--	--	1
L-51	Table, marking machine, steel	2	3	3
L-52	Tank, soap, 100-gallon	1	1	2
L-53	Truck, tub, laundry, wash- room, metal	2	4	4
L-56	Tub, wash, laundry, 2- compartment	1	1	1
L-57	Tumbler, laundry, reversing, open end 36" x 30"	3	3	3
L-57-1	Tumbler, laundry, reversing, open end, 42" x 42"	2	4	5
L-64-1	Washer-extractor, 50 lbs.	2	1	2
L-64-2	Washer-extractor, 100 lbs.	--	1	1
L-65-9	Washer, laundry, metal, 60" x 126", 6-pocket, w/fully automatic controls	1	2	2
L-65-41	Washer, laundry, metal, 42" x 54", w/horizontal partitions and fully automatic controls	1	2	3

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Table II - Laundries -- Frigid Zone

Item No.	Item	2,500-man	5,000-man
L-3	Board, ironing, laundry-type, w/electric iron	1	1
L-5-1	Conveyor, laundry, power-operated, 27" x 6" x 2'2"	1	2
L-7-1	Cooker, starch, 50-gallon	1	1
L-13	Extractor, laundry, 17"	1	1
L-13-6	Extractor, laundry, 50", un-loading	2	1
L-13-7	Extractor, laundry, 54", un-loading	--	1
L-15	Form, hosiery, rotary	1	2
L-19-2	Ironer, flatwork, 8-roll, 120"	1	1
L-23	Machine, folding, laundry, automatic-adjusting, single-lane	1	1
L-25	Machine, bundle-tying	1	2
L-27-2	Machine, marking, laundry, 8-character, air-operated	5	10
L-29	Machine, sewing, hand-operated, button	1	1
L-29-3	Machine, sewing, general, motor-operated	1	1

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Table II - Laundries -- Frigid Zone - continued

Item No.	Item	2,500-man	5,000-man
L-33	Press, handkerchief, 20"	1	1
L-35	Press unit, shirt-finishing, 2-operator, cabinet-type, each unit consisting of:	1	2
L-35-1	1 Press, shirt body-bosom, cabinet-type, air-operated	--	--
L-35-2	1 Press, shirt-sleeve, cabinet- type, air-operated	--	--
L-35-3	1 Press, shirt-yoke-and-shoulder finishing, air-operated	--	--
L-35-4	1 Press, shirt-collar-and-cuff finishing, air-operated	--	--
L-35-5	1 Machine, automatic, shirt- folding	--	--
L-41	Press unit, utility, consisting of:	1	2
L-41-1	1 Press, laundry, garmet, 54"	--	--
L-41-2	2 Presses, laundry, mushroom	--	--
L-42	Press unit, trouser, consisting of:	1	2
L-42-1	3 Presses, laundry, garmet, 53" x 18" x 13"	--	--

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Table II - Laundries -- Frigid Zone - continued

Item No.	Item	2, 500-man	5, 000-man
L-48	Press unit, coat-pressing, 1-operator, consisting of:	1	1
L-49-1	1 Press, sleeve, double-cabinet-type, automatic	--	--
L-35-1	1 Press, body-bosom, cabinet-type, air-operated	--	--
L-49-4	1 Press, collar-lapel	--	--
L-52	Tank, soap, 100-gallon	1	1
L-53	Truck, tub, laundry, wash-room, metal	7	13
L-56	Tub, wash, laundry, 2-compartment	1	1
L-57	Tumbler, laundry, drying, reversing, 36" x 30"	1	1
L-57-1	Tumbler, laundry, drying, reversing, 42" x 42"	3	6
L-64-1	Washer-extractor, 50 lbs.	1	2
L-64-2	Washer-extractor, 100 lbs.	1	1
L-65-4W	Washer, laundry, metal, 42" x 54", wool	2	3
L-65-7W	Washer, laundry, metal, 42" x 84", wool	--	1
L-65-7	Washer, laundry, metal, 42" x 84"	1	2

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Table III - Laundries -- Tropical and Temperate Zones

Item No.	Item	2,500- man	5,000- man	10,000- man	20,000- man
L-3	Board, ironing, laundry-type, w/electric iron	1	1	2	2
L-4	Circulating soap system, w/2 each 900-gal. tanks or 2 900-gal. compartments	--	--	--	1
L-4-1	Circulating soap system, w/2 each 500-gal. tanks	--	--	1	--
L-5	Conveyor, laundry, assorting, modified to length shown on drawings	1	1	2	3
L-5-1	Conveyor, laundry, power-operated, 27' 6" x 2' 2"	1	--	--	1
L-5-2	Conveyor, laundry, power-operated, 45' 6" x 2' 2"	--	1	--	--
L-5-3	Conveyor, laundry, power-operated, 72' 6" x 2' 2"	--	--	2	2
L-5-6	Conveyor, power-operated, to feed spreading devices from conditioner 19' x 2'	--	--	--	2
L-5-7	Conveyor, feeding, 48" x 84", conditioner, 13' x 1' 10"	--	--	--	1
L-5-8	Conveyor, small-piece conditioner, 14' x 12"	--	--	--	1
L-8	Cooker, starch, 50-gallon	1	1	2	3

Table III - Laundries -- Tropical and Temperate Zones -
continued

Item No.	Item	2,500- man	5,000- man	10,000- man	20,000- man
L-7-1	Cutting and measuring machine	1	1	2	4
L-9-1	Device, spreading and feed- ing, large-piece	--	--	--	2
L-13	Extractor, laundry, 17"	1	1	1	1
L-13-6	Extractor, laundry, 50", unloading	2	1	1	2
L-13-7	Extractor, laundry, 54", unloading	--	1	2	3
L-13-8	Extractor, laundry, 60", unloading	--	--	1	2
L-15	Form, hosiery, rotary	1	2	4	8
L-19-2	Ironer, flatwork, 8-roll, 120"	1	1	2	4
L-23	Machine, folding, automatic- adjusting, single-lane	--	1	1	2
L-23-5	Machine, folding, laundry, small-piece, automatic- adjusting	--	--	--	1
L-25	Machine, bundle-tying	2	2	4	6
L-27-2	Machine, marking, laundry, air-operated, 8-character	4	8	15	25
L-29-2	Machine, sewing, button, electric	1	1	2	2

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Table III - Laundries -- Tropical and Temperate Zones
continued

Item No.	Item	2,500- 5,000- 10,000- 20,000-			
		man	man	man	man
L-29-3	Machine, sewing, general, electric	1	1	2	2
L-33	Press, handkerchief, rotary, air-operated, 20"	1	1	2	4
L-35	Press unit, shirt-finishing, 2-operator, cabinet-type, each unit consisting of:	2	3	5	10
L-35-1	1 Press, shirt body-bosom, cabinet-type, air-operated	--	--	--	--
L-35-2	1 Press, shirt sleeve, cab- inet-type, air-operated	--	--	--	--
L-35-3	1 Press, shirt-yoke-and- shoulder finishing, air- operated	--	--	--	--
L-35-4	1 Press, shirt-collar-and- cuff finishing, air-op- erated	--	--	--	--
L-35-5	1 Machine, automatic shirt-folding	--	--	--	--
L-41	Press unit, trouser, each consisting of:	1	2	4	8
L-41-1	1 Press, laundry, gar- ment 54"	--	--	--	--

Table III - Laundries -- Tropical and Temperate Zones -
continued

Item No.	Item	2,500- man	5,000- man	10,000- man	20,000- man
L-41-2	2 Presses, laundry, mushroom	--	--	--	--
L-42	Press unit, trouser, consisting of:	1	6	12	23
L-42-1	3 Presses, laundry, garment, 53" x 18" x 13"	--	--	--	--
L-47	Press unit, coat-pressing, 2-operator, cabinet- or rotary-type, component presses determined by type of unit	--	1	2	3
L-48	Press unit, coat-pressing, 1-operator, consisting of:	1	--	--	--
L-49-1	1 Press, sleeve, double-cabinet-type, automatic	--	--	--	--
L-35-1	1 Press, body-bosom, cabinet-type, air-operated	--	--	--	--
L-49-4	1 Press, collar-lapel	--	--	--	--
L-50	Stacker, flatwork, small-piece	--	--	--	1
L-51	Table, marking machine metal	4	8	15	25
L-52	Tank, soap, 100-gallon	1	2	4	3
L-53	Truck, tub, laundry, metal	9	4	6	10

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Table III - Laundries -- Tropical and Temperate Zones -
continued

Item No.	Item	2,500- man	5,000- man	10,000- man	20,000- man
L-56	Tub, wash, laundry, 2- compartment	1	1	1	2
L-57	Tumbler, laundry, revers- ing, 36" x 30"	1	1	2	2
L-57-1	Tumbler, laundry, revers- ing, 42" x 42"	3	5	10	21
L-61-2	Tumbler, conditioning, 48" x 84", large-piece	--	--	--	1
L-61-3	Tumbler, conditioning, 34" x 72", small-piece	--	--	--	1
L-64-1	Washer-extractor, laundry, 50 lbs.	1	1	1	2
L-64-2	Washer-extractor, laundry, 100 lbs.	1	1	1	1
L-65-4	Washer, laundry, metal, 42" x 54"	2	2	4	8
L-65-7	Washer, laundry, metal, 42" x 84", slide out w/ fully automatic controls	--	4	8	16
L-65-9	Washer, laundry, metal, 60" x 126" w/fully auto- matic controls	--	--	1	2

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Table IV - Drycleaning Plants -- Frigid Zone

Item No.	Item	2,500- man	5,000- man
DC-2-2	Absorber, moisture, dry-cleaning	1	1
DC-6	Board, steam, finishing, w/steam iron	1	1
DC-8	Extractor, drycleaning, 20", w/explosionproof motor	1	--
DC-8-1	Extractor, drycleaning, 26", w/explosionproof motor	--	1
DC-8-3	Extractor, drycleaning, 40", w/explosionproof motor	1	1
DC-10	Extractor, laundry, 17"	1	--
DC-10-1	Extractor, laundry, 20"	--	1
DC-12	Filter, pressure, screen scraper, 600 g.p.h. w/ explosionproof motor and pump	1	--
DC-12-8	Filter, pressure, screen scraper, 3200 g.p.h. w/ explosionproof motor and pump	1	1

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Table IV - Drycleaning Plants -- Frigid Zone - continued

Item No.	Item	2,500-man	5,000-man
DC-12-12	Filter, pressure, screen scraper, 8000 g. p. h., w/ explosionproof motor and pump	--	1
DC-14	Former, trouser, dry-cleaning	1	1
DC-16	Iron, steam, puff, shoulder and mushroom, w/stand	1	1
DC-18-1	Machine, marking, 8-character, manually operated	2	3
DC-20-1	Machine, sewing, general, motor-operated, medium-heavy duty	1	1
DC-17	Machine, garment-finishing, steam/air, w/electric motor	1	2
DC-22F	Press, drycleaning, mushroom, manually operated, w/air vacuum	1	3
D-22-2	Press, drycleaning, utility, manually operated, w/air vacuum	3	6
DC-24-2	Pump, service, drycleaning, 90 g. p. h.	--	2

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Table IV - Drycleaning Plants -- Frigid Zone - continued

Item No.	Item	2,500- man	5,000- man
DC-26-4	Still, vacuum, 125 g.p.h., w/ explosionproof motor and pump	1	--
DC-26-8	Still, vacuum, 250 g.p.h., w/explosionproof motor and pump	--	1
DC-28	Table, scrub	1	1
DC-30	Tank, extractor, drain, 20-gallon	1	1
DC-30-3	Tank, extractor, drain, 100-gallon	1	1
DC-32-5	Tank, solvent, 750-gallon	2	--
DC-32-7	Tank, solvent, 1,125-gallon	--	2
DC-34	Trap, button, 600-2,000 g.p.h., 1 12" x 30"	1	--
DC-34-1	Trap, button, 3,200-5,000 g.p.h., 12" x 36"	1	2
DC-36	Truck, tub, metal, dry- cleaning	2	3
DC-40-1	Tumbler, drycleaning, 36" x 30", nonreversing, w/ explosionproof motor	1	2

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Table IV - Drycleaning Plants -- Frigid Zone - continued

Item No.	Item	2,500-man	5,000-man
DC-40-3	Tumbler, drycleaning, 42" x 42" reversing, w/explosionproof motor	2	4
DC-42	Tumbler, laundry, 36" x 18", nonreversing	1	--
DC-42-1	Tumbler, laundry, 36" x 30", nonreversing	--	1
DC-44	Tub, wash, laundry, 2-compartment	1	1
DC-46	Unit, spotting, steam, complete w/board, steam spotting gun, and steam vacuum	1	2
DC-48	Vacuum system -- 4-5 presses, w/condenser tank, 12 x 36	1	--
DC-48-6	Vacuum system -- 10-14 presses, w/condenser tank, 14 x 48	--	1
DC-50	Washer, drycleaning, metal, 30" x 30", w/explosionproof motor	1	--
DC-50-2	Washer, drycleaning, metal, 36" x 54", w/explosionproof motor	--	1
DC-50-3	Washer, drycleaning, metal, 42" x 64", w/explosionproof motor	1	--

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Table IV - Drycleaning Plants -- Frigid Zone - continued

Item No.	Item	2,500- man	5,000- man
DC-50-4	Washer, drycleaning, metal, 54" x 70", w/explosionproof motor	--	1
DC-54-1	Washer, laundry, metal, open- end, 27" x 15", 25 pounds	1	--
DC-54-2	Washer, laundry, metal, open- end, 36" x 18", 50 pounds	--	1

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Table V - Drycleaning Plants -- Temperate Zone

Item No.	Item	1,000-		2,500-	5,000-	10,000-	20,000-
		man	man	man	man	man	man
DC-2-2	Absorber, moisture, drycleaning	1	1	1	1	1	2
DC-6	Board, steam, finishing, w/steam iron and steam vacuum	1	1	1	1	1	2
DC-8	Extractor, drycleaning, 20", w/explosionproof motor	1	--	1	1	1	1
DC-8-3	Extractor, drycleaning, 40", w/explosionproof motor	--	1	--	--	--	--
DC-8-5	Extractor, drycleaning, 60", w/explosionproof motor	--	--	1	1	1	2
DC-10	Extractor, laundry, 17"	1	--	--	--	--	--
DC-10-1	Extractor, laundry, 20"	--	1	--	--	--	--
DC-10-3	Extractor, laundry, 30"	--	--	1	1	1	1
DC-12-4	Filter, pressure, screen scraper, 1300 g.p.h., w/explosionproof motor and pump	1	--	1	1	1	1
DC-12-8	Filter, pressure, screen scraper, 3200 g.p.h., w/ explosionproof motor and pump	--	1	--	--	--	--

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Table V - Drycleaning Plants -- Temperate Zone - continued

Item No.	Item	1,000-	2,500-	5,000-	10,000-	20,000-
		man	man	man	man	man
DC-12-12	Filter, pressure, screen scraper, 8000 g. p. h., w/ explosionproof motor and pump	--	--	1	2	4
DC-14	Former, trouser, dry- cleaning	1	1	1	2	2
DC-16	Iron, steam, puff, shoulder and mush- room, w/stand	1	1	1	1	2
DC-17	Machine, garment finish- ing, steam/air; w/ electric motor	--	1	1	2	3
DC-18-1	Machine, marking, 8- character, manually operated	1	2	2	4	8
DC-20-1	Machine, sewing, gen- eral, motor-operated	1	1	1	2	2
DC-22	Press, drycleaning, mushroom, air-oper- ated w/air, vacuum	--	1	2	4	8
DC-22-2	Press, drycleaning, utility, air-operated w/air, vacuum	2	4	8	12	24
DC-24-2	Pump, service, dry- cleaning, 90 g. p. m.	--	--	2	2	2

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Table V - Drycleaning Plants -- Temperate Zone - continued

Item No.	Item	1,000-	2,500-	5,000-	10,000-	20,000-
		man	man	man	man	man
DC-26	Still, vacuum, 35 g. p. h., w/explosionproof motor and pump	1	--	--	--	--
DC-26-4	Still, vacuum, 125 g. p. h., w/explosionproof motor and pump	--	1	--	--	--
DC-26-8	Still, vacuum, 250 g. p. h., w/explosionproof motor and pump	--	--	1	--	2
DC-26-10	Still, vacuum, 400 g. p. h., w/explosionproof motor and pump	--	--	--	1	--
DC-28	Table, scrub	1	1	1	1	1
DC-30	Tank, extractor, drain, 20-gallon	1	--	1	1	1
DC-30-3	Tank, extractor, drain, 100-gallon	--	1	--	--	--
DC-30-4	Tank, extractor, drain, 200-gallon	--	--	1	1	2
DC-32-1	Tank, solvent, 200- gallon	2	--	--	--	--
DC-32-5	Tank, solvent, 750- gallon	--	2	--	--	--

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Table V - Drycleaning Plants -- Temperate Zone - continued

Item No.	Item	1,000- man	2,500- man	5,000- man	10,000- man	20,000- man
DC-32-7	Tank, solvent, 1,125- gallon	--	--	2	--	--
DC-32-9	Tank solvent, 2,000- gallon	--	--	--	3	5
DC-34	Trap, button, 600- 2,000 g.p.h., 12" x 30"	1	--	1	1	1
DC-34-1	Trap, button, 3,200- 5,000 g.p.h., 12" x 36"	1	1	1	2	4
DC-36	Truck, tub, metal, dry- cleaning	1	2	3	5	7
DC-40-1	Tumbler, drycleaning, 36" x 30", nonrevers- ing, w/explosionproof motor	1	--	3	2	2
DC-40-3	Tumbler, drycleaning, 42" x 42", reversing, w/explosionproof motor	--	1	2	4	8
DC-42	Tumbler, laundry, re- versing, 36" x 18"	1	--	--	--	--
DC-42-1	Tumbler, laundry, re- versing, 36" x 30"	--	1	1	2	2
DC-44	Tub, wash, laundry, 2- compartment	1	1	1	1	1

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Table V - Drycleaning Plants -- Temperate Zone - continued

Item No.	Item	1,000- 2,500- 5,000- 10,000- 20,000-				
		man	man	man	man	man
DC-46	Unit, spotting, steam, complete w/spotting gun and steam vacuum	1	1	2	4	6
DC-48	Vacuum system, 4-5 presses, w/condenser tank	1	1	--	--	--
DC-48-6	Vacuum system, 10-14 presses, w/condenser tank	--	--	1	2	--
DC-48-8	Vacuum system, 15-19 presses, w/condenser tank	--	--	--	--	2
DC-50	Washer, drycleaning, metal w/explosion- proof motor, 30" x 30"	1	1	1	1	1
DC-50-1	Washer, drycleaning, metal w/explosion- proof motor, 30" x 48"	1	--	--	--	--
DC-50-3	Washer, drycleaning, metal w/explosion- proof motor, 42" x 64"	--	1	--	--	--
DC-50-4	Washer, drycleaning, metal w/explosion- proof motor, 54" x 70"	--	--	1	2	4

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Table V - Drycleaning Plants -- Temperate Zone - continued

Item No.	Item	1,000- 2,500- 5,000- 10,000- 20,000-				
		man	man	man	man	man
DC-54-1	Washer, laundry, metal, 27" x 15", open-end, 25 lb. cap	1	1	--	--	--
DC-54-2	Washer, laundry, metal, 36" x 18", open-end, 50 lb. cap	--	--	1	1	1

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Table VI - Drycleaning Plants -- Tropical and Semitropical Zones

Item No.	Item	1,000- 2,500- 5,000- 10,000- 20,000-				
		man	man	man	man	man
DC-2-2	Absorber, moisture, dry-cleaning	1	1	1	1	1
DC-6	Board, steam, finishing, w/steam iron and steam vacuum	1	1	1	1	2
DC-8	Extractor, drycleaning, 20", w/explosionproof motor	1	--	1	1	1
DC-8-1	Extractor, drycleaning, 26", w/explosionproof motor	--	1	--	--	--
DC-8-4	Extractor, drycleaning, 48", w/explosionproof motor	--	--	1	1	--
DC-8-5	Extractor, drycleaning, 60", w/explosionproof motor	--	--	--	1	2
DC-10	Extractor, laundry, 17"	1	1	--	--	--
DC-10-1	Extractor, laundry, 20"	--	--	1	1	--
DC-10-2	Extractor, laundry, 26"	--	--	--	--	1
DC-12	Filter, pressure, screen scraper, w/explosion-proof motor and pump, 600 g.p.h.	1	--	1	1	1

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Table VI - Drycleaning Plants -- Tropical and Semitropical Zones
continued

Item No.	Item	1,000- man	2,500- man	5,000- man	10,000- man	20,000- man
DC-12-4	Filter, pressure, screen scraper, w/explosion- proof motor and pump, 1,300 g. p. h.	--	1	--	--	--
DC-12-12	Filter, pressure, screen scraper, w/explosion- proof motor and pump, 8,000 g. p. h.	--	--	1	1	2
DC-14	Former, trouser, dry- cleaning	1	1	1	2	2
DC-16	Iron, steam, puff, shoulder and mushroom, w/stand	1	1	1	1	1
DC-17	Machine, garment finishing, -- steam/air, w/electric motor	--	1	1	1	2
DC-18-1	Machine, marking, man- ually-operated, 8- character	1	2	2	4	8
DC-20-1	Machine, sewing, gen- eral, motor-operated	1	1	1	2	2
DC-22	Press, drycleaning, air- operated, mushroom	--	1	1	2	4
DC-22-2	Press, drycleaning, air- operated, utility (Presses to have steam, air, and vacuum.)	2	2	4	8	12

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Table VI - Drycleaning Plants -- Tropical and Semicropical Zones
continued

Item No.	Item	1,000- 2,500- 5,000- 10,000- 20,000-				
		man	man	man	man	man
DC-24-2	Pump, service, dry-cleaning, 90 g. p. h.	--	--	2	2	2
DC-26	Still, vacuum, 20-35 g. p. h., w/explosion-proof motor and pump	1	1	--	--	--
DC-26-8	Still, vacuum, 250 g. p. h., w/explosion-proof motor and pump	--	--	1	1	--
DC-26-10	Still, vacuum, 400 g. p. h., w/explosion-proof motor and pump	--	--	--	--	1
DC-28	Table, scrub, 29" x 55"	1	1	1	1	1
DC-30	Tank, extractor, drain, 20-gallon	1	1	1	1	1
DC-30-3	Tank, extractor, drain, 100-gallon	--	--	1	1	--
DC-30-4	Tank, extractor, drain, 200-gallon	--	--	--	--	1
DC-32	Tank, solvent, 150-gallon	2	--	--	--	--
DC-32-1	Tank, solvent, 200-gallon	--	2	--	--	--

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Table VI - Drycleaning Plants -- Tropical and Semitropical Zones
continued

Item No.	Item	1,000- 2,500- 5,000- 10,000- 20,000-					
		man	man	man	man	man	man
DC-32-7	Tank, solvent, 1,125- gallon	--	--	2	2	--	
DC-32-9	Tank, solvent, 2,000- gallon	--	--	--	--	--	3
DC-34	Trap, button, 600- 2,000 g.p.h., 12" x 30"	1	--	1	1	1	
DC-34-1	Trap, button, 3,200- 5,000 g.p.h., 12" x 36"	--	1	1	1	1	2
DC-36	Truck, tub, metal, drycleaning	1	1	2	3	4	
DC-40-1	Tumbler, drycleaning, w/explosionproof motor, reversing, 36" x 30"	1	1	1	2	2	
DC-40-3	Tumbler, drycleaning, w/explosionproof motor, reversing, 42" x 42"	--	--	1	2	3	
DC-42	Tumbler, laundry, non- reversing, 36" x 18"	1	1	--	--	--	
DC-42-1	Tumbler, laundry, non- reversing, 36" x 30"	--	--	1	1	1	
DC-44	Tub, wash, laundry, 2- compartment	1	1	1	1	1	

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Table VI - Drycleaning Plants -- Tropical and Semitropical Zones
continued

Item No.	Item	1,000-	2,500-	5,000-	10,000-	20,000-
		man	man	man	man	man
DC-46-1	Unit, spotting, steam, complete w/steam spotting gun, and steam vacuum	1	1	2	4	6
DC-48	Vacuum system, complete, 4-5 presses, w/condenser tank	--	1	1	2	--
DC-48-6	Vacuum system, complete, 10-14 presses, w/condenser tank	--	--	--	--	2
DC-50	Washer, drycleaning, metal, 30" x 30"	1	--	1	1	1
DC-50-1	Washer, drycleaning, metal, 30" x 48"	--	1	--	--	--
DC-50-3	Washer, drycleaning, metal, 42" x 64"	--	--	1	--	--
DC-50-4	Washer, drycleaning, metal, 54" x 70"	--	--	--	1	2
DC-54-1	Washer, laundry, metal, open-end, 27" x 15", 25-lb. cap	1	1	--	--	--
DC-54-2	Washer, laundry, metal, open-end, 18" x 36", 50-lb. cap	--	--	1	1	1

2-06. PERSONNEL. The number of personnel employed in laundries and drycleaning plants, as set forth in table VII below, will be used as a guide in determining plumbing facilities. The ratio of persons per fixture and the amount of chilled drinking water required will be determined by reference to EM 1110-345-556.

Table VII - Approximate Number of Male and Female Personnel,
Laundries and Drycleaning Plants

<u>Type of Plant</u>	<u>Capacity</u>	<u>Operating at Maximum Capacity Personnel (number)</u>		
		<u>Office</u>	<u>Male</u>	<u>Female</u>
Laundry	2,500 men	4	10	45
Laundry	5,000 men	5	12	73
Laundry	10,000 men	7	20	120
Laundry	20,000 men	10	29	218
Laundry	1,000 beds	2	6	28
Laundry	1,500 beds	3	8	45
Laundry	2,000 beds	3	12	52
Drycleaning	1,000 men	--	4	6
Drycleaning	2,500 men	--	5	9
Drycleaning	5,000 men	--	10	14
Drycleaning	10,000 men	--	16	21
Drycleaning	20,000 men	--	29	40

2-07. WATER HARDNESS. Hardness in water is objectionable because it forms sticky lime and magnesium deposits that are difficult to remove from clothing, and because of the cost in terms of additional soap needed to accomplish a given amount of washing. As a general rule, hardness is measured in terms of grains of calcium carbonate per U. S. gallon of water.

7,000 grains = 1 pound

One grain = 17.14 parts per million (p. p. m.)

Hard waters contain calcium and/or magnesium salts in solution. Mineral salts may be present in various forms that require different processes for removal of these salts. When they are present as

bicarbonates, they may be separated from the water by heating. This type of hardness is referred to as temporary. Permanent hardness refers to the type that cannot be removed by heating. Any process of removing mineral salts from water is called water-softening. The most economical and practical method of softening water is through the base-exchange method. Plants operating without water-softening equipment can provide for partial removal of the hardness by the use of an alkali, but it is uneconomical to use either soap or alkali to soften water.

a. General. Reference is made to EM 1110-345-515.

b. Softeners for Laundry-Water Supply. Softening of water for all laundries is required where the water supply has a total hardness of 2.5 grains per gallon (43 p.p.m.) or more, expressed as equivalent calcium carbonate (CaCO_3). Where these conditions exist, zeolite water softeners will be installed to soften all laundry water to zero hardness.

(1) Type. Softeners will be sodium-cycle zeolite, pressure-type. The peak rate of flow will not exceed 8 g.p.m. for styrene-base resinous synthetic zeolite rated at 20,000 grains of equivalent calcium carbonate (CaCO_3) exchange per cubic foot, when regenerated with salt, using not more than 275 pounds per 1000 grains of hardness, expressed as calcium carbonate (CaCO_3) removed.

(2) Number and capacity. In general, not less than two softeners of equal size will be provided for each laundry. When all units are operated in parallel, they should deliver the peak rate of flow required by the laundry and provide an exchange capacity sufficient to soften the water required by the laundry for at least an 8-hour day with regeneration. The exchange capacity and size of softener units will be governed by the maximum hardness of water being softened in gallons per day, number of softener units installed, and the peak demand in gallons per minute. With an exchange capacity based upon one regeneration of all units per 8-hour day, the total exchange capacity in grains expressed as equivalent CaCO_3 can be calculated as follows:

Total exchange capacity = average gallons per hour \times 8 \times hardness of water in grains expressed as calcium carbonate (CaCO₃).

Generally, two or more units with diameter and height of tank selected from available standard size units will be installed. Units will meet both maximum flow rate in gallons per minute and exchange capacity requirements in grains expressed as CaCO₃. Zeolite bed will be not less than 30 inches in depth.

(3) Method of calculating laundry-water demands.

The total quantity of water in gallons per day required for laundry operation will depend upon the size of the laundry, which in turn will be determined by the type and amount of laundry to be handled. Each pound of laundry will require 5 gallons of water for all processes. Laundries will operate on a 40-hour week.

$$\text{Gallons per week} = \text{Pounds per week} \times 5$$

$$\text{Average gallons per hour} = \frac{\text{Gallons per week}}{40}$$

$$\text{Peak, g.p.m.} = \frac{\text{Total capacity of all washers in lbs.} \times 5}{3 \times 2 \times 8}$$

The peak demand for water in gallons per minute will be governed by the size and number of washers. If three or more washers are installed, it will be assumed that at least one-third of the capacity of the washers will be filled simultaneously, that filling must be completed in 2 minutes, and that eight fillings will be required for each wash cycle (approximately 1 hour). In case of small laundries with only two washers, the number 3 in the formula above will be changed to 2 and, if only one washer, the number 3 will be changed to 1.

2-08. GALLONS OF WATER AT VARIOUS DEPTHS IN WASHING MACHINES. The gallons of water at various depths in washing machines are shown in tables VIII and IX.

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Table VIII - Gallons of Water in Washers Containing
Water Only

Size (inches)	Gallons of water at depths in inches above bottom of cylinder											
	1	2	3	4	5	6	7	8	9	10	11	12
30 x 30	6	9	12	16	20	24	28	32	37	42	47	52
36 x 36	6	10	15	20	25	30	36	42	48	55	62	68
36 x 54	10	16	22	29	36	44	52	61	70	80	89	98
36 x 64	12	18	25	32	42	52	62	71	82	92	103	114
42 x 36	7	11	16	21	27	33	46	46	53	60	67	75
42 x 54	10	16	22	30	39	47	56	66	76	86	96	107
42 x 64	12	19	26	36	46	56	66	77	89	100	112	125
42 x 72	14	21	30	41	52	62	74	86	98	111	125	140
42 x 84	15	25	35	46	57	70	85	100	114	130	145	162
42 x 96	17	27	39	51	65	80	97	113	129	147	165	182
44 x 46	8	12	17	23	28	34	42	48	55	62	69	76
44 x 54	11	17	24	32	42	50	60	69	79	89	100	110
44 x 60	14	19	27	35	45	54	65	76	87	98	110	122
44 x 72	16	23	32	42	53	63	76	88	102	116	130	143
44 x 84	18	26	37	49	62	76	89	103	118	134	150	167
44 x 96	20	29	42	55	70	84	100	117	134	152	170	188
44 x 108	22	32	47	62	78	95	112	132	150	170	191	211
44 x 120	24	35	50	68	87	105	125	145	167	187	210	233

Table IX - Gallons of Water in Washing Machines Containing
Load of Saturated Clothing

Note. The quantity of water specified in each case is for the machine containing a normal saturated load of clothing. These values are average readings over several series of tests and are sufficiently accurate for all practical purposes.

Size (inches)	Gallons of water for gage reading in inches while machine is running											
	2	3	4	5	6	7	8	9	10	11	12	
36 x 36	11	14	17	20	23	26	30	33	36	40	44	
36 x 54	16	21	25	30	34	40	45	50	55	60	66	
36 x 64	19	24	30	35	40	45	53	58	64	70	77	
36 x 72	22	28	34	40	46	52	59	66	73	80	88	
36 x 84	25	32	39	46	53	61	70	77	85	93	102	
36 x 96	29	37	45	53	61	69	80	88	96	106	116	
42 x 36	15	20	23	27	31	34	37	39	43	46	50	
42 x 54	25	33	38	44	50	56	60	65	71	77	82	
42 x 64	27	35	41	47	54	60	65	70	76	82	88	
42 x 72	30	39	46	53	61	67	73	78	86	93	100	
42 x 84	35	46	54	62	71	79	85	91	100	108	116	
42 x 96	40	53	62	71	81	91	98	104	115	124	133	
44 x 36	17	22	25	30	34	37	41	43	47	51	55	
44 x 54	25	33	37	45	51	56	62	66	72	77	83	
44 x 72	33	43	51	58	67	73	80	86	94	102	110	
44 x 84	38	50	60	68	78	84	94	102	107	119	129	
44 x 96	45	59	67	80	91	99	110	115	125	136	146	
44 x 108	50	67	77	87	100	108	120	132	139	153	166	
44 x 120	57	73	85	97	111	120	134	145	154	170	184	

2-09. METHOD OF COMPUTING COMPRESSED-AIR REQUIREMENTS. The total capacities of air compressors will be determined by reference to the requirements as tabulated in Appendix I for laundry equipment and Appendix II for drycleaning equipment. Compressed-air piping is covered by EM 1110-345-556.

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2-10. METHOD OF COMPUTING HOT-WATER REQUIREMENTS AND SIZES OF HEAT RECLAIMERS. Capacities and sizes of water heaters and heat reclaimers are covered by EM 1110-345-556.

2-11. METHODS OF COMPUTING STEAM REQUIREMENTS. The total steam requirements for laundry and drycleaning equipment will be determined by reference to Appendix I for laundry equipment and Appendix II for drycleaning equipment. Detailed requirements will be determined in accordance with EM 1110-345-550.

SECTION III - FOOD-SERVICE FACILITIES

3-01. TECHNICAL INFORMATION TABLES. Kitchen-equipment schedules in Appendix III; Bread-Bakery-Equipment Schedule in Appendix IV; and Pastry-Kitchen-Equipment Schedule in Appendix V indicate categories of equipment, joint schedule numbers, dimensions of equipment, and electrical, gas, and steam ratings. Joint schedule numbers will be used only for hospital installation. The following classes refer to types of equipment:

Class 1 - Built-in Equipment

Class 2 - Civilian-Type End Items (Installed Equipment)

Class 3 - Other Types (Installed Equipment)

Class 4 - Portable Equipment

3-02. KITCHENS AND MESS FACILITIES. The capacity and capability of any kitchen to serve a given number of persons depend on the type and kind of meals, the length of time allotted to serving, and the management and skill of those operating the mess. Inasmuch as kitchens are designed to function as mass-production or bulk-cooking plants and to reduce manual effort to a minimum, it is of utmost importance to consider the kitchen traffic that is incident to the preparation, cooking, and serving of food. Traffic is greatly affected by the location of doors and passageways, and care should be exercised in selecting their location.

3-03. BASIC KITCHEN DESIGN. Definitive and standard construction drawings will be followed for the layout as well as for all details in every case where these drawings are applicable. The floor plan will be studied to obtain adequate light and ventilation, easy entrance for supplies and personnel, and to obtain a distribution of space such as would avoid crowding in some areas and excess space in others. The proper allotment of space is of prime importance to the correct functioning of a mess. Compact areas, as described in paragraph 3-05, promote maximum efficiency in the kitchen. Excess space is often as undesirable as insufficient space, as steps and time are wasted in an area of excess space. Ventilation of cooking and dishwashing areas will conform to National Board of Fire Underwriters Standard No. 96.

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3-04. TYPES OF MESSES. The various types of messes differ principally in the functional requirements of the using service. The principal types of messes and the variations of service are as follows:

a. Enlisted-Personnel and Officers Field-Ration Messes.

(1) Enlisted-personnel messes are normally cafeteria type. The number of serving lines required for various capacity mess-halls is shown in Table of Allowances, TA 20-4. As enlisted personnel are required to scrap waste food from their trays and dishes, the dish-washing room will be so located that the cross traffic between the line of men being served and the men scrapping waste food will be reduced to a minimum.

(2) Messing facilities for officers field-ration mess will be the same in all respects as those furnished enlisted men.

b. Open Messes. The purpose of open messes is to provide recreational and dining facilities for officers and for noncommissioned officers. The operation of the kitchen for open messes is essentially the same as that for enlisted men's messes, except that the serving counter of the open mess will be designed for either cafeteria or table service. The serving counter will be located in the kitchen area with a partition between the counter and messhall, and with adequate means for traffic for either cafeteria or table service. In addition to the messhall, a snack bar will be provided adjacent to the messhall, with easy access to the kitchen.

c. Service Clubs. The purpose of service clubs is to provide recreational facilities for enlisted men similar to those provided for officers and noncommissioned officers. The food service will consist of a messhall and a snack bar. The operation of the kitchen will be essentially the same as that of open messes except that the serving counter in the service club will be designed for cafeteria service only. Service clubs will also be provided with a serving pantry adjacent to the clubroom, to serve light refreshments for social functions. The serving pantry will be provided with a domestic range, refrigerator, and counter with sink.

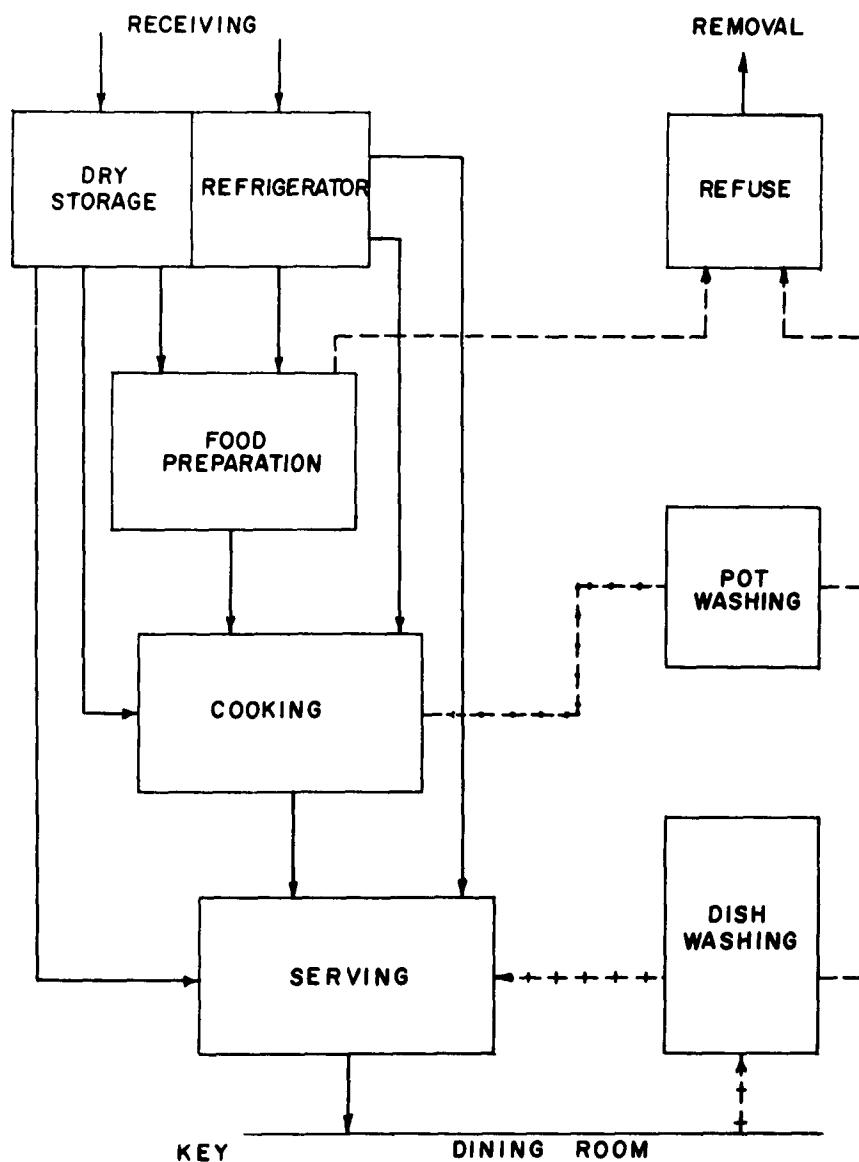
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d. Post Restaurants. Post restaurants for civilians differ in some respects from messhalls for enlisted personnel in that civilians are furnished a greater variety of food. The selection of a greater variety of food and the time consumed in paying for meals slows down the rate of service; hence, more serving lines are required than in cafeterias for enlisted personnel. The design of civilian cafeterias also depends on local conditions, such as availability to other restaurants. In populated areas where other restaurants are available, the percentage of total civilian personnel using the cafeteria will be lower than the percentage of those using the cafeteria in unpopulated, outlying areas where other restaurants are not available. The number of serving lines for civilian cafeterias, including the net areas for various functions, is outlined in AR 415-31. To develop maximum economy and efficiency and to keep the dining-room space at a minimum, the serving period is fixed at 2-1/2 hours. Provision will be made for the rapid collection of soiled dishes and their dispatch to the dishwashing room. Since it is customary for post restaurants to be operated by both male and female personnel, toilet and locker facilities will be provided adjacent to the kitchen for men and for women.

3-05. KITCHENS. Kitchens are divided into several areas, each area given over to specific tasks in the receiving, storing, preparing, cooking, and serving of food. The various kitchen areas will be arranged as outlined on figure 1, beginning with the storage area. Consideration of the areas in the order shown on the kitchen flow chart assures a successful design with a uniform flow and with a minimum of backtracking and cross traffic. Partitions will be kept to a minimum. Dwarf partitions will be provided wherever practicable. Provisions will be made for utilities, such as office room and janitors' closets. Toilet facilities for kitchen personnel will be provided as outlined in EM 1110-345-556, and will be so located that there will be no direct access to any portion of the kitchen. An alternate design for toilet facilities for kitchen personnel will be shown. This design will provide two toilet rooms for kitchens operated by both male and female personnel. A locker room with entrance vestibule will be provided for each toilet room.

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a. Storage Area. The storage area will be located adjacent to the delivery entrance of the kitchen to permit storage of foodstuff quickly and to exclude traffic from the work area of the kitchen. The storage area usually consists of two areas as follows:

(1) Dry-storage area, for canned and packaged food, flour, root vegetables, etc. The dry-storage room will be provided with adjustable shelves for package storage and platforms for bulk storage. In messes serving more than 500 consumers, more platforms and comparatively less shelving are required than in smaller messes. Sufficient space will be provided under the shelves for cans for flour, coffee, and sugar.

(2) Refrigerated-storage area. Refrigerators will be of three types:

(a) Small, self-contained reach-in type, up to and including 65 cubic feet.

(b) Deep-freeze type, up to 20 cubic feet, for storage of frozen food.

(c) Walk-in type, from 48 square feet floor space and larger. The walk-in type requires a compressor that will be located near the refrigerator, and if air-cooled, will be placed adjacent to the exterior wall, with a louvered opening in the wall. The larger built-in refrigerators are divided into two or three compartments and these compartments will be utilized as follows:

	Percent of Space
<u>Two Compartments:</u>	
Meat	33-1/3
Dairy products and vegetables.....	66-2/3
 <u>Three Compartments:</u>	
Meat	33-1/3
Dairy products	33-1/3
Vegetables	33-1/3

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b. Food-Preparation Area. The food-preparation area, as its name implies, is concerned with the preparation of foods prior to cooking and processing. The preparation area will be adjacent to the storage area and will contain the necessary equipment as authorized in the table of allowances for the various kitchen capacities. The tasks performed in this area fall into two main classes: The preparation of vegetables and the preparation of meats. Where meat is processed in a central meat-cutting plant, there will be only minor preparation of meat in the kitchen. In kitchens serving less than 1,000 personnel, the preparation of food is accomplished satisfactorily within a single area, while in kitchens serving 1,000 or more, and in hospital kitchens, it is considered desirable to separate the operations into two areas: One for vegetables and the other for meats. In kitchens where vegetable peelers are authorized, the peeler will be located in the vegetable-preparation area adjacent to a sink. The portion of floor on which the peeler is located will be depressed, with sanitary coves in all corners of the depressed area.

c. Cooking Area. The cooking area, containing the most important kitchen activities, will receive special attention as to the location and grouping of all items of cooking equipment. Ventilating hoods equipped with grease filter will be provided with exhaust fans having capacity to obtain a velocity of 100 feet per minute over the horizontal face of the hoods.

(1) The range is the basic cooking device. Ranges will be arranged in a battery either in a continuous line or back-to-back when four or more ranges are required.

(2) Auxiliary cooking devices. As the capacity of the kitchen increases, it becomes necessary to depend upon auxiliary cooking devices such as roasting and baking ovens, vegetable steamers, steam-jacketed kettles, and deep-fat fryers. These items have high productive capacities and save valuable space. The auxiliary cooking devices will be grouped in the same area as the ranges. Grouping the main cooking devices in this manner simplifies ventilation, which will be provided through a hood extending over the entire cooking area, connected to an exhaust fan of sufficient capacity to provide the air changes as described in EM 1110-345-550. The steam-jacketed kettles and vegetable steamers will be placed in a depressed-floor area with sanitary coves in all corners. In hospital kitchens, additional cooking devices will be required, such as broilers and kettles for cooking hot cereal. Cooks' tables with pan rack, worktables, and cooks' sinks

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will be provided adjacent to the cooking equipment to facilitate the placing or removal of food from tables or ranges and ovens. The maximum distance from the cooking devices to the tables will be 4 feet, and the minimum distance will be 3 feet 6 inches. Aisle space will be sufficient to permit loading or unloading of food with the doors of ovens, etc. in open position, but not so wide open as to cause unnecessary steps or interference with passageway.

d. Serving Area. The serving area or areas will be so located between the kitchen and the dining room as to permit an uninterrupted flow of prepared and cooked food to the serving counter during the entire serving period. In general, the serving area will consist of a continuous counter with all necessary and authorized equipment for the efficient and rapid serving of individual portions of food, and a back counter for containers of food for replenishment to the serving counter as needed. Space will be provided for trays and cutlery at the entrance of the serving counter. Where griddles are installed, they will be located on the cafeteria counter, with the portion on which the griddle is located recessed to such a depth that a cover may be placed over the griddles to form a counter top when griddles are not in use.

e. Dishwashing Area. The dishwashing area, including space for scraping of soiled dishes and temporary storage of dishes, will be separated from the preparation of food as far as is practicable and consistent with the size and type of mess. The successful sterilization of dishes and cutlery basically requires an adequate supply of hot water of not less than 180 degrees F., while the washing is done with water at a temperature of 150 degrees F. Machine washing provides for sterilization in the form of a spray of 180 degrees F. Instructions regarding the determination of water-heater and hot-water-storage capacities will be found in EM 1110-345-556. The dishwashing operation consists of prewashing or preflushing, washing, sterilizing, and air-drying. These facilities will be arranged in order of operation to provide a systematic flow of dishes from the soiled-dish counter to the dishwashing machine and then to the clean-dish storage, with a minimum of lost motion. Pant-leg-type ventilating hoods will be provided with exhaust fans having capacities to obtain a velocity of approximately 100 feet per minute over the horizontal face of the hoods.

f. Pot-Washing Area. The pot-washing area is a portion of the kitchen devoted to the cleaning of pots, pans, and other cooking

utensils. This area will be located within easy access to the cooking area. The temperature of the wash water is raised by a steam-jet water heater installed in one compartment of the pot-wash sink.

3-06. KITCHEN EQUIPMENT. The cooking of food involves the use of five different methods that require five different types of cooking equipment: Boiling, steaming, frying, baking or roasting, and broiling. The kitchen equipment described is listed in Kitchen-Equipment Schedule, Appendix III, showing dimensions, input in kw., or hp., for electrical devices, input in B.t.u. per hour for gas devices, and pounds of steam per hour for steam devices. This information will provide the basis of design for the interior utilities of the building. Equipment authorized for the various sizes of kitchens is listed in the table of allowances. Major items of kitchen equipment are presented in the subparagraphs that follow:

a. Ranges. Heavy-duty ranges are best suited for long hours of service, for cooking large amounts of food, and for use with heavy cooking utensils. An oven suitable for roasting and baking will be located underneath the top. Hot-top ranges have a heavy cast iron top on which pots and pans are placed. This style of range is intended for heavy-duty continuous cooking. Generally, the tops are made of alloy castings for longer life and freedom from warpage. Fry-top ranges have top surfaces designed for use as a griddle for frying, and provision is made to carry excess grease into a suitable receptacle. The frying surface should be capable of maintaining an even, steady, low temperature regardless of the amount of food placed on it. Domestic ranges are used in locations where the cooking load is light, such as in quarters. Range ovens are heavily insulated to conserve heat and to prevent its escape into the kitchen. Oven heat controls are provided to insure accurate cooking temperatures, thus avoiding waste of food and fuel.

b. Deck-Type Ovens. Heavily insulated deck-type ovens, when required to supplement the range ovens, are designed for baking or roasting or both baking and roasting. They are generally provided with individually controlled decks, so that different types of food requiring different temperatures can be prepared at the same time. Thermostatic heat controls permit maintaining any desired temperature from 250 degrees F. up, thus permitting any type of roasting or

baking and duplication of good results.

c. Revolving-Tray Ovens. Revolving-tray ovens, originally developed for the food-production industry and bakeries, are used in some large kitchens. These ovens have flat trays suspended from two revolving spiders, rotating in an arrangement similar to a Ferris wheel. The entire assembly revolves in a chamber heated from below.

d. Broilers. The characteristic that distinguishes broilers from other cooking appliances is that the food is cooked by radiant heat instead of by conduction or convection. Broilers are sometimes used for browning meringues and casserole dishes and often for making toast.

e. Combination Broiler and Oven. The combination broiler and oven may be used alone or in battery with heavy-duty ranges. The heat is radiated from a position above the broiler grid. Food is placed on a grid that is adjustable by a balanced mechanism. The grid slides in and out for placing and removing food. Above the broiler is an oven that is generally employed as a holding or warming oven for food.

f. Combination Broiler and Griddle. The combination broiler and griddle consists of a cast-iron griddle mounted above the broiler burners. Broiler-griddle combinations are frequently incorporated as a part of the battery of ranges.

g. Deep-Fat Fryers. The deep-fat fryers consist of deep kettles containing cooking oil or fat with heat controlled by thermostats. The thermostatic controls maintain temperatures ranging from 200 to 400 degrees F., and operate with an accuracy at any setting of plus or minus 5 degrees F.

h. Coffee Urns. Coffee urns are available with thermostatic heat controls for economy purposes and to help maintain the quality of the coffee. The urns are equipped with safety pressure and vacuum valves. The controls are designed to provide a steam pressure of approximately 1-1/2 pounds. This pressure is utilized to force the water from the water compartment over the coffee. The vacuum release will relieve external pressure when sudden condensation or cooling of the urn occurs. The urns are equipped with heavy

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high-pressure glass gages. One gage indicates the amount of water, and the other the amount of coffee in the urn.

i. Toasters. In the motor-driven-conveyor-type toaster, the bread is carried through the thermostatically controlled toast oven and automatically discharged into the toast slide. The conveyor is driven at a uniform speed by a small electric motor. In the pop-up-type toaster, four slices of bread are placed in a slot at the top. The first four slices put into the toaster require 1 minute to complete the cycle, and thereafter four slices are toasted every 20 seconds.

j. Vegetable Steamers. These appliances are known as steam cookers, vegetable steamers, or steamers. The heat of steam is applied directly to the food to be prepared. The steamer steps up the steaming operation for handling large or small quantities. The operation is accomplished by an arrangement of chambers equipped with special doors, piping, and controls. The food is placed in rectangular perforated or solid metal baskets inside a heavily constructed compartment. After the compartment is loaded and closed, steam is admitted and circulated through the food baskets. On coming in contact with the food, the steam condenses and the heat is absorbed by the food. When the cooking process is completed, the steam supply is cut off and any steam remaining in the compartment is allowed to escape. Steam cookers will cook 4 to 6 pounds of food with each pound of steam. Cooking compartments are under steam pressure ranging from 3 to 5 pounds per square inch.

k. Sinks. Table X will be used as a guide in developing plans for the number and sizes of sinks for kitchens:

Table X - Sinks Required for Troop Kitchens

No. of troops	Cooks' sinks 24" x 24" x 12"	Scullery sinks, 2 compartments, 30"	Pot-washing sinks, 30" x 24" x 20"	
		x 24" x 16"	2 compartments	3 compartments
Up to 100	--	2	--	--
101 to 300	1	1	1	--
301 to 900	1	1	--	1
901 to 1,400	2	2	--	1
1,401 to 2,400	2	3	--	1
2,401 to 3,400	2	3	--	1
3,401 to 4,400	3	4	--	1

3-07. **MESSHALLS.** The entrance, exit, and aisles will be so arranged as to provide a direct flow of traffic to the entrance end of the cafeteria counter and to prevent cross traffic on leaving the dining hall. As cross ventilation is essential to proper comfort in dining halls, light and ventilation will be carefully considered. To obtain maximum use of space, tables will be placed diagonally, with a minimum of 2 feet between the corners of tables. Dining halls will be provided with water coolers accessible to all parts of the dining room.

3-08. **BAKERIES.** Bakery machinery and equipment will be grouped according to their functions as shown on standard drawings. Equipment will be provided as prescribed in the table of allowances. Technical control of bakeries is the responsibility of the U. S. Army Subsistence Center, Chief of Support Services. Technical control of operations includes the formulation of policies, the establishment of prices, and the authority to issue instructions covering the utilization of equipment, bakery methods, functional arrangements, supply allowances, and procedures as well as directives concerning the quality of the work performed.

3-09. **BASIC BAKERY DESIGN.** The general layout of machinery will be such that the line of operation in the entire baking process will be continuous in order to eliminate congestion, retracing of flow lines, or crisscrossing of various operations.

a. Bread Bakeries. The line of operation starts from the flour-storage room and proceeds through the ingredient room to the mixers. Provision is made in the ingredient room for the storage of yeast, milk, shortening, and other ingredients. The water-cooling-equipment plant will furnish chilled water to a water meter located near the mixers, so that the quantity of water supplied to the mixers can be determined. After mixing, the dough is placed in dough troughs and transported to the fermentation cabinet, where the dough is allowed to ferment for the required length of time. After fermentation is completed, the dough is passed through the dividers, rounder, overhead intermediate proofer, and moulder. The formed pieces of dough are then placed in pans and loaded on proof racks, wheeled into the proofing cabinet, and allowed to stand for the required proofing time. The loaded racks are then wheeled to the ovens where the pans are placed in the ovens for baking. Upon completion of the baking process, the loaves are dumped from the pans onto bread racks and wheeled into the bread storage room. All bread is cooled, sliced, wrapped, stored, and issued from this room. The line of operation is roughly U-shaped through the building, starting from and returning to the platform.

b. Pastry Kitchens. The line of operation starts from the ingredient room to the bake room where the ingredients are weighed at the scaling table for the production schedule. After the ingredients are measured, they are blended or mixed in vertical mixers. The mixed batters or doughs are scaled, shaped, and panned on worktables in the makeup area. Pie fillings and boiled icings are prepared in the cooking area. Doughnut machines, when authorized, are generally installed adjacent to the cooling area. Fumes from machines are vented to the outside atmosphere. After baking, the products are delivered to the cooling area. When baked products are cooled, they are iced or topped and stored in the issue area.

3-10. **SERVICE FACILITIES.** Provisions will be made for bakery-service facilities only where suitable commercial or common services of this type are not or cannot be made available, or where the use of such commercial facilities will not result in ultimate economy to the Government. The standard plans show equipment that will accomplish the work in 8 hours of operation per day. When it is deemed necessary, the bakery may be operated for more than 8 hours per day to meet the

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increased demands. The plant capacity can be increased 100 percent by increasing the hours of operation by 100 percent.

a. Bread Bakery. A bread bakery will be authorized only at installations where a need for such facility exists. Bakery design sizes will be based on an 8-hour daily operation.

b. Pastry Kitchens. In addition to the bread bakery, a central pastry kitchen will be authorized at installations where the Chief, Support Services has determined the need for such a facility. Pastry-kitchen design sizes will be based on an 8-hour daily operation.

3-11. PERSONNEL. Tables XI and XII provide guides as to the recommended allotment of personnel for bakeries. These tables will not be considered as authorized tables of allowances:

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Table XI - Personnel Allotment for Bread Bakeries

Rated plant capacity (persons)	5,000	10,000	20,000
Plant will serve (persons)	3,000 to 7,500	7,501 to 15,000	15,001 to 30,000
<u>First 8-hour shift only:</u>			
Chief Baker	1	1	1
Maintenance Man	1	1	1
Issue Clerk	--	1	1
Assistant Issue Clerk	--	--	1
<u>Each 8-hour shift:</u>			
Shift Leader	1	1	1
Mixer	1	1	1
Assistant Mixer	--	1	1
Divider Operator	1	1	1
Assistant Divider Operator	--	1	1
Moulder Operator	1	1	1
Assistant Moulder Operator	--	1	1
Oven Operator	1	1	1
Assistant Oven Operator	1	1	1
Bread Rackers	--	1	1
Slicer and Wrapper Operator	1	1	1
Relief Man	1	1	2
Total first shift	10	15	17
Total second shift	<u>8</u>	<u>12</u>	<u>13</u>
Aggregate	18	27	30

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Table XII - Personnel Allotment for Central Pastry Kitchens

Plant Capacities	2,500	5,000	10,000	20,000
Chief Baker	1	1	1	1
Assistant Chief Baker	--	--	--	1
Shift Leaders	--	--	2	2
Stock Room Clerk	--	--	--	1
Scalers	--	--	--	2
Mixers	1	1	2	2
Oven Men	1	1	2	2
Oven Helpers	--	1	2	2
Bench Men	2	2	4	4
Helpers (Bench)	--	2	2	4
Issue Clerk	1	1	1	1
Delivery Men	1	1	2	2
Kitchen Police	1	2	4	4

FOR THE CHIEF OF ENGINEERS:



WILLIAM M. GLASGOW, JR.
Colonel, Corps of Engineers
Executive

5 Appendixes

I Laundry-Equipment
Schedule

II Drycleaning-Equipment
Schedule

III Kitchen-Equipment Schedule

IV Bread-Bakery-Equipment
Schedule

V Pastry-Kitchen-Equipment
Schedule

APPENDIX I

LAUNDRY-EQUIPMENT SCHEDULE

Equipment schedule indicates item numbers, floor space, and utility requirements for all items of laundry equipment.

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. per hr.	Air, cu. ft. at 85 p.s.i.
L-3	Board, ironing, laundry- type, w/iron	10 to 16 x 53	--	--	1	--
L-4	Circulating soap system w/2 each 900-gal. tanks	224" x 116"	1,800 gal.	3	--	430
L-4-1	Circulating soap system w/2 each 500-gal. tanks	54" x 108"	1,000 gal.	2	--	250
L-5	Conveyor, laundry, as- orting, 45 ft. by 30 in. wide	--	--	1	--	--
L-5-1	Conveyor, laundry, power-operated, 27- 1/2 ft. by 26 in. wide	--	--	1	--	--
L-5-2	Conveyor, laundry, power-operated, 45- 1/2 ft. by 26 in. wide	--	--	1-1/2	--	--
L-5-3	Conveyor, laundry, power-operated, 72- 1/2 ft. by 26 in. wide	--	--	1-1/2	--	--
L-5-6	Conveyor, to feed spreading devices from conditioner 19 ft. by 2 ft.	--	--	1	--	--

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, cu. ft. at 85 per hr. p.s.i.
L-5-7	Conveyor, feeding, 48 in. by 84 ft., condi- tioner, 13 ft. by 1 ft. 10 in.	--	--	1	--	--
L-5-8	Conveyor, small piece (conditioner) 14 ft. by 1 ft.	--	--	1	--	--
L-7	Cooker, starch, steam heated	29 x 33	25 gal.	--	--	10
L-7-1	Cooker, starch, steam heated	32 x 38	50 gal.	--	--	16
L-8	Cutting machine	40 x 50	--	1/4	--	--
L-9-1	Device, spreading and feeding, large piece	--	--	1/2	--	--
L-13	Extractor, laundry, 17-in.	26 x 46	15 lbs.	3/4	--	--
L-13-3	Extractor, laundry, 30-in.	40 x 58	70 lbs.	3	--	--
L-13-5	Extractor, laundry, 48-in.	66 x 48	200 lbs.	7- 1/2	--	--
L-13-6	Extractor, laundry, unloading, 50-in.	72 x 60	320 lbs.	12- 1/2	--	.15

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city lbs.	Elec. rating hp.	Steam lbs. kw. per hr.	Air, cu. ft., 85 p.s.i.
L-13-7	Extractor, laundry, unloading, 54-in.	76 x 60	320 lbs.	12- 1/2	--	.15
L-13-8	Extractor, laundry, unloading, 60-in.	100 x 80	450 lbs.	15	--	.15
L-15	Forms, hosiery, rotary	34 x 24	--	1/4	--	58
L-19-1	Ironer, flatwork, 6- roll, 120-in.	180 x 168	360 lbs.	7- 1/2	463	--
L-19-2	Ironer, flatwork, 8- roll, 120-in.	212 x 168	550 lbs.	10	618	--
L-23	Machine, folding, laun- dry, automatic ad- justing, 1-lane	153 x 137	--	3/4	--	--
L-23-5	Machine, folding, auto- matic adjusting, small piece	34 x 136	--	1/2	--	--
L-25	Machine, bundle-tying	24 x 20	--	1/4	--	--
L-27-2	Machine, marking, laundry, air-oper- ated, 8-character	11 x 22	--	--	--	0.05
L-29	Machine, sewing, hand- operated, button	--	--	--	--	--

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, ft., 85 per hr.	cu. p. s. i.
L-29-2	Machine, sewing, button, motor-operated	--	--	1/6	--	--	--
L-29-3	Machine, sewing, general-purpose, motor-operated, medium, heavy-duty	--	--	1/2	--	--	--
L-33	Press, handkerchief, rotary, air-operated	60 x 22	--	1/3	--	40	.5
L-35	Press unit, shirt-finishing, 2-operator, cabinet-type, air-operated, consisting of:						
L-35-1	1--press, shirt body-bosom, cabinet-type						
L-35-2	1--press, shirt-sleeve, cabinet-type						
L-35-3	1--press, shirt-yoke and shoulder finishing						
L-35-4	1--press, shirt-collar-and-cuff finishing						
		114 x 159	80 shirts per hr.	--	185	1.714	

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, cu. ft., 85 per hr. p.s.i.
L-35-5	1--machine, automatic shirt-folding					
L-41	Press, utility unit, air-operated, consisting of:					
L-41-1	1--press, laundry, garment, 54-in.	64 x 46		--	--	70 .54
L-41-2	2-presses, laundry, mushroom	35 x 31		--	--	
L-42	Press unit trouser, consisting of:					
L-42-1	3--presses, laundry, garment, 53" x 18" x 13"			--	--	150 1.43
L-47	Press unit, coat-finishing, 2-operator, cabinet- or rotary-type, component presses determined by type of unit	--	--	--	200	900
L-48	Press unit, coat-finishing, 2-operator, cabinet-type, air-operated, consisting of:					

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air cu. ft., 85 per hr. p.s.i.
L-49-1	2--presses, laundry, coat-sleeve, double-buck, cabinet-type	120 x 196	120 coats per hr.	-- -- --	206	.928
L-49-4	2--presses, laundry, coat-collar single-buck					
L-49-12	1--press, laundry, coat, double-buck, rotary cabinet-type					
L-50	Stacker, flat work, small piece	149 x 74	--	1/2	--	--
L-51	Table, marking-machine, steel	28 x 52	--	--	--	--
L-52	Tank, soap, 100 gals.	--	--	--	--	25
L-53	Truck, tub, laundry, washroom, metal	26 x 36	--	--	--	--
L-56	Tub, wash, laundry	24 x 48	--	--	--	--
L-57	Tumbler, drying, laundry, nonreversing, open-end, 36" x 30"	43 x 51	40 lbs	1/3, 3/4	150	--
L-57-1	Tumbler, drying, laundry, reversing, open-end, 42" x 42"	51 x 65	100 lbs.	1/2, 1	250	--

Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, cu. ft., 85 per hr. p.s.i.
L-61-2	Tumbler, shakeout and conditioning, 48" x 84", large-piece	135 x 66	1500 lbs.	2, -- 1-1/2	204	--
L-61-3	Tumbler, conditioning, 34" x 72", small-piece	95 x 94	800 lbs.	1-1/2, -- 1/2	100	--
L-63-2	Washer, metal, end- loading, 27" x 15"	44 x 56	25 lbs.	1/2 --	--	--
L-63-3	Washer, metal, end- loading, 30" x 18"	44 x 62	35 lbs.	3/4 --	--	--
L-63-4	Washer, metal, end- loading, 36" x 18"	44 x 62	50 lbs.	3/4 --	--	--
L-64-1	Washer-extractor	56 x 49	50 lbs. 2- 3	--	--	0.1
L-64-2	Washer-extractor	78 x 74	100 lbs.	2-1/2 -- 5	--	0.1
L-65	Washer, metal-cylinder, 30" x 30"	44 x 56	60 lbs.	1 --	--	--
L-65-1	Washer, metal-cylinder, 36" x 36"	51 x 78	110 lbs.	1- -- 1/2	--	--
L-65-2	Washer, metal-cylinder, 36" x 48"	51 x 86	112 lbs.	2 --	--	--
L-65-3	Washer, metal-cylinder, 36" x 54"	51 x 96	165 lbs.	3 --	--	--

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Laundry-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city lbs.	Elec. rating hp. kw.	Steam lbs. per hr.	Air, cu. ft., 85 p. s. i.
L-65-4	Washer, metal-cylinder, 42" x 54"	57 x 78	225 lbs.	3 --	--	--
L-65-5	Washer, metal-cylinder, 42" x 64"	57 x 86	230 lbs.	3 --	--	--
L-65-6	Washer, metal-cylinder, 42" x 72"	57 x 98	300 lbs.	5 --	--	--
L-65-7	Washer, metal-cylinder, 42" x 84"	57 x 108	350 lbs.	5 --	--	--
L-65-8	Washer, metal-cylinder, 42" x 96"	57 x 118	400 lbs.	5 --	--	--
L-65-9	Washer, metal-cylinder	81 x 174	1200 lbs.	7- 1/2	--	0.1
L-65-4W	Washer, laundry, metal, 42" x 54"	57 x 78	225 lbs.	3 --	--	--
L-65-7W	Washer, laundry, metal, 42" x 84"	57 x 108	350 lbs.	5 --	--	--
L-65-41	Washer, laundry, metal, 42" x 54", w/horizontal partitions and fully automatic controls	57 x 78	225 lbs.	3 --	--	--
L-65-81	Washer, laundry, metal, 42" x 96", w/horizontal partitions and fully automatic controls	57 x 118	400 lbs.	5 --	--	--

APPENDIX II

DRYCLEANING-EQUIPMENT SCHEDULE

Equipment schedule indicates item numbers, floor space, and utility requirements for all items of drycleaning equipment.

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, cu. ft., 85 per hr. p.s.i.
DC-2	Absorber, moisture, drycleaning, 1/2-in.	--	20- 35 g. p. h.	--	--	--
DC-2-1	Absorber, moisture, drycleaning, 1-in.	--	75- 200 g. p. h.	--	--	--
DC-2-2	Absorber, moisture, drycleaning, 1-1/4-in.	--	250- 400 g. p. h.	--	--	--
DC-6	Board, ironing, finish- ing, steam and vacuum, w/steam iron	10-16 x 53	--	--	1.0	20
DC-8	Extractor, dryclean- ing, 20-in., explo- sionproof motor	30 x 41	20 lbs.	1	--	--
DC-8-1	Extractor, dryclean- ing, 26-in., explo- sionproof motor	35 x 50	45 lbs.	2	--	--
DC-8-2	Extractor, dryclean- ing, 30-in., explo- sionproof motor	40 x 55	60 lbs.	3	--	--
DC-8-3	Extractor, dryclean- ing, 40-in., explo- sionproof motor	65 x 42	120 lbs.	5	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city lbs.	Elec. rating hp.	Steam kw.	Air, cu. ft., 85 p.s.i.
DC-8-4	Extractor, drycleaning, 48-in., explosionproof motor	75 x 57	170 lbs.	7- 1/2	--	--
DC-8-5	Extractor, drycleaning, 60-in., explosionproof motor	87 x 68	270 lbs.	10	--	--
DC-10	Extractor, laundry, 17-in.	24 x 35	15 lbs.	1	--	--
DC-10-1	Extractor, laundry, 20-in.	30 x 41	25 lbs.	3	--	--
DC-10-2	Extractor, laundry, 26-in.	35 x 50	50 lbs.	3	--	--
DC-10-3	Extractor, laundry, 30-in.	40 x 55	75 lbs.	3	--	--
DC-12	Filter, pressure, manual scraper	21 x 21	600 g. p. h.	--	--	--
DC-12-1	Explosionproof motor-driven pump	15 x 25	--	3/4	--	--
DC-12-2	Filter, pressure, manual scraper	28 x 28	1,000 g. p. h.	--	--	--
DC-12-3	Explosionproof motor-driven pump	20 x 39	--	1	--	--
DC-12-4	Filter, pressure, manual scraper	33 x 33	1300 g. p. h.	--	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw. per hr.	Air, cu. ft., 85 p.s.i.
DC-12-5	Explosionproof motor-driven pump	20 x 39	-- 1- 1/2	-- --	-- --	-- --
DC-12-6	Filter, pressure, manual scraper	36 x 36	2000 g. p. h.	-- --	-- --	-- --
DC-12-7	Explosionproof motor-driven pump	21 x 39	-- 1- 1/2	-- --	-- --	-- --
DC-12-8	Filter, pressure, manual scraper	41 x 41	3200 g. p. h.	-- --	-- --	-- --
DC-12-9	Explosionproof motor-driven pump	15 x 27	-- 1- 1/2	-- --	-- --	-- --
DC-12-10	Filter, pressure, manual scraper	45 x 45	5000 g. p. h.	-- --	-- --	-- --
DC-12-11	Explosionproof motor-driven pump	15 x 27	-- 3	-- --	-- --	-- --
DC-12-12	Filter, pressure, manual scraper	53 x 53	8000 g. p. h.	-- --	-- --	-- --
DC-12-13	Explosionproof motor-driven pump	15 x 29	-- 5	-- --	-- --	-- --
DC-14	Former, trouser, dry- cleaning	14 x 68	60 pair per hr.	-- --	40	--
DC-16	Iron, puff, steam, shoulder-mushroom, w/stand	14 x 16	-- --	-- --	35	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. <u>rating</u> hp. kw.	Steam lbs. per hr.	Air, cu. ft., 85 p.s.i.
DC-17	Machine, garment-fin- ishing	30 x 30	--	1/4 --	40	--
DC-18	Machine, marking, manual-operated, 6-character	12 x 18	12 bnd per hr.	--	--	--
DC-18-1	Machine, marking, manual-operated, 8-character	12 x 18	12 bnd per hr.	--	--	--
DC-20-1	Machine, sewing, motor-operated medium heavy duty	36 x 48	--	1/3 --	--	--
DC-22	Press, drycleaning air-operated, w/ steam and vacuum, mushroom	36 x 47-1/2	--	--	28	.273
DC-22F	Press, drycleaning, manual-operated w/ air and vacuum	36 x 47	--	--	--	.273
DC-22-1	Press, drycleaning, air-operated, w/ steam and vacuum, trouser	65 x 47-1/2	--	--	33	.519
DC-22-2	Press, drycleaning, air-operated, w/ steam and vacuum, utility, w/o shoulder steamer	56 x 47-1/2	--	--	33	.339

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.	Air, cu. ft., 85 per hr.	Air, cu. p.s.i.
DC-24	Pump, service, dry-cleaning, w/explosionproof motor	20 x 39	35 g. p. h.	1/2 --	--	--	--
DC-24-1	Pump, service, dry-cleaning, w/explosionproof motor	20 x 39	50 g. p. h.	2 --	--	--	--
DC-24-2	Pump, service, dry-cleaning, w/explosionproof motor	30 x 42	90 g. p. h.	3 --	--	--	--
DC-26	Still, vacuum	36 x 22	20-35 g. p. h.	--	35	--	--
DC-26-1	Explosionproof motor-driven pump	17 x 26	--	1/2 --	--	--	--
DC-26-2	Still, vacuum	44 x 29	75 g. p. h.	--	75	--	--
DC-26-3	Explosionproof motor-driven pump	21 x 28	--	3/4 --	--	--	--
DC-26-4	Still, vacuum	49 x 29	125 g. p. h.	--	125	--	--
DC-26-5	Explosionproof motor-driven pump	21 x 38	--	3/4 --	--	--	--
DC-26-6	Still, vacuum	52 x 35	200 g. p. h.	--	200	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city (in.)	Elec. rating hp. kw.	Steam lbs. per hr.	Air, cu. ft., 85 p.s.i.
DC-26-7	Explosionproof motor-driven pump	21 x 38	--	1 --	--	--
DC-26-8	Still, vacuum	62 x 41	250 g. p. h.	--	250	--
DC-26-9	Explosionproof motor-driven pump	21 x 38	--	1- 1/2	--	--
DC-26-10	Still, vacuum	48 x 72	400 g. p. h.	--	400	--
DC-26-11	Explosionproof motor-driven pump	29 x 23	--	2 --	--	--
DC-28	Table, scrub	36 x 60	--	--	--	--
DC-30	Tank, extractor, drain	30 x 11	20 gal.	--	--	--
DC-30-1	Tank, extractor, drain	48 x 18	30 gal.	--	--	--
DC-30-2	Tank, extractor, drain	50 x 20	50 gal.	--	--	--
DC-30-3	Tank, extractor, drain, underground	37 x 31	100 gal.	--	--	--
DC-32	Tank, solvent, above- ground	31 x 31	150 gal.	--	--	--
DC-30-4	Tank, extractor, drain, underground	37 x 37	200 gal.	--	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw. per hr.	Air, cu. ft., 85 p.s.i.
DC-32-1	Tank, solvent, above-ground	33 x 33	200 gal.	-- --	--	--
DC-32-2	Tank, solvent, above-ground (2 compartment)	--	300 gal.	-- --	--	--
DC-32-3	Tank, solvent, above-ground (2 compartment)	--	400 gal.	-- --	--	--
DC-32-4	Tank, solvent, above-ground	49 x 49	550 gal.	-- --	--	--
DC-32-5	Tank, solvent, above-ground	57 x 57	750 gal.	-- --	--	--
DC-32-6	Tank, solvent, above-ground	--	845 gal.	-- --	--	--
DC-32-7	Tank, solvent, above-ground	--	1125 gal.	-- --	--	--
DC-32-8	Tank, solvent, above-ground	--	1690 gal.	-- --	--	--
DC-32-9	Tank, solvent, above-ground	85 x 85	2000 gal.	-- --	--	--
DC-34	Trap, button, 600-2000 g. p. h.	12 x 12	2000 g. p. h.	-- --	--	--
DC-34-1	Trap, button, 3200-5000 g. p. h.	13 x 13	5000 g. p. h.	-- --	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating hp.	Steam lbs. kw.per hr.	Air, cu. ft., 85 p.s.i.
	DC-34-2 Trap, button, 8000 g. p. h.	19 x 19	8000 g. p. h.	-- --	-- --	-- --
DC-36	Truck, tub, metal, dry- cleaning	22 x 34	6 bu.	-- --	-- --	-- --
DC-40	Tumbler, drycleaning, w/explosionproof motor, 36" x 24"	40 x 50	25 lbs.	1/4, -- 1/2	130	--
DC-40-1	Tumbler, drycleaning, w/explosionproof motor, 36" x 30"	40 x 56	35 lbs.	1/3, -- 3/4	150	--
DC-40-2	Tumbler, drycleaning, w/explosionproof motor, 42" x 90"	123 x 87	105 lbs.	2, 5 --	408	--
DC-40-3	Tumbler, drycleaning, w/explosionproof motor, 42" x 42"	47 x 49	100 lbs.	2, 5 --	105	--
DC-42	Tumbler, laundry, non- reversing, 36" x 18"	40 x 44	20 lbs.	1/4, -- 1/3	100	--
DC-42-1	Tumbler, laundry, non- reversing, 36" x 30"	40 x 56	40 lbs.	1/3, -- 3/4	150	--
DC-44	Tub, wash, laundry, 2-compartment	16 x 60	--	-- --	--	--
DC-46	Unit, spotting, steam	15 x 61	--	-- --	35	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating	Steam lbs. per hr.	Air, cu. ft., 85 p.s.i.
DC-46-1	Unit, spotting, steam, complete w/spotting board, vacuum and steam gun	15 x 61	--	1/12 --	35	--
DC-48	Vacuum system, 4-5 presses	41 x 17	--	1 --	--	--
DC-48-1	Condenser tank, 12" x 36"	15 x 15	--	-- --	--	--
DC-48-2	Vacuum system, 6-7 presses	41 x 17	--	1- -- 1/2	--	--
DC-48-3	Condenser tank, 12" x 36"	15 x 15	--	-- --	--	--
DC-48-4	Vacuum system, 8-9 presses	41 x 17	--	2 --	--	--
DC-48-5	Condenser tank, 12" x 36"	15 x 15	--	-- --	--	--
DC-48-6	Vacuum system, 10-14 presses	49 x 17	--	2 --	--	--
DC-48-7	Condenser tank, 14" x 48"	17 x 17	--	-- --	--	--
DC-48-8	Vacuum system, 15-19 presses	49 x 21	--	3 --	--	--
DC-48-9	Condenser tank, 14" x 48"	17 x 17	--	-- --	--	--

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Drycleaning-Equipment Schedule - continued

Item No.	Item	Floor space (in.)	Capa- city	Elec. rating	Steam lbs. per hr.	Air, cu. ft., 85 p.s.i.
DC-50	Washer, drycleaning, metal-cylinder, 30" x 30"	60 x 54	35	1/2 --	--	--
DC-50-1	Washer, drycleaning, metal-cylinder, 30" x 48"	78 x 54	56	3/4 --	--	--
DC-50-2	Washer, drycleaning, metal-cylinder, 36" x 54"	89 x 58	95	2 --	--	--
DC-50-3	Washer, drycleaning, metal-cylinder, 42" x 64"	97 x 63	155	3 --	--	--
DC-50-4	Washer, drycleaning, 54" x 70"	199 x 75	300	5 --	--	--
DC-54	Washer, laundry, end- loading, metal-cylin- der, 20" x 20"	32 x 33	15	1/2 --	--	--
DC-54-1	Washer, laundry, end- loading, metal-cylin- der, 27" x 15"	42 x 31	25	1/2 --	--	--
DC-54-2	Washer, laundry, end- loading, metal-cylin- der, 36" x 18"	42 x 45	50	3/4 --	--	--

APPENDIX III

KITCHEN-EQUIPMENT SCHEDULE

Class	Joint Schedule No.	Item No.	Item	Size Inches	Ratings					Gas	Steam Lbs. per hr.
					Electrical			Type Outlet	B.t.u. per hr.		
					HP	KW	Volts				
2	K050	K-36	Bain marie, heavy duty: Type II, size A, electric	54 x 36 x 34	--	5.0	208	Single	F	--	--
2	K055	K-36	Type I, size A, steam	54 x 36 x 34	--	--	--	Single	F	--	46
2	K057	K-36	Type III, size A, gas	54 x 36 x 34	--	--	--	Single	F	40,000	--
2	K060	K-36-1	Type II, size B, electric	72 x 36 x 34	6.0	208	--	Single	F	--	--
2	K065	K-36-1	Type I, size B, steam	72 x 36 x 34	--	--	--	Single	F	--	61
2	K067	K-36-1	Type III, size B, gas	72 x 36 x 34	--	--	--	Single	F	60,000	--
4	K075	K-1	Block, meat, and tables, cutting, meat, size 3	30 x 30 x 16	--	--	--	Single	F	--	--
2	K095	K-2	Broiler, toaster and griddle com- bination, gas	32 x 23 x 41	--	--	--	Single	F	30,000	--
2	K097	K-2-1	Broiler, electric	36 x 28 x 26	--	10.0	208	Single	F	--	--
4	K100	K-4	Cabinet, ice cream storage, self- contained, electric.	40 x 31 x 34	1/4	--	--	Single	A	--	--
4	K120	K-4-1	15 gallons	52 x 31 x 34	1/4	--	--	Single	A	--	--
4	K140	K-4-2	25 gallons	64 x 31 x 34	1/3	--	--	Single	A	--	--
4	K160	K-4-3	35 gallons	76 x 31 x 34	1/3	--	--	Single	A	--	--
2	K112	K-61	45 gallons	22 x 24 x 22	--	--	--	Single	A	--	--
4	K127	K-5	Cabinet, spray rinse w/ 3 racks, (push through type)	40 x 31 x 34	--	--	--	Single	A	--	--
1	K157	K-37	Chest, ice storage, No 2, 200 lbs.	31 x 31 x 34	--	--	--	Single	A	--	--
1	K167	K-37-1	Cold pan, counter section, cafeteria	46 x 28	--	--	--	Single	A	--	--
1	K174	K-37-2	Cold pan, counter section, cafeteria	60 x 28	--	--	--	Single	A	--	--
			Coffeemaker, gas or electrically operated.	72 x 28	--	--	--	Single	A	--	--
2	K140	K-6	Material J-metal bowls:	26 x 11 x 6	--	--	--	Single	B	18,000	--
2	K145	K-6	Type A, class 1, style I, size B, 36 cup, gas	26 x 11 x 6	1.6	115	--	Single	B	--	--
2	K150	K-6-1	Type A, class 2, style I, size B, 36 cup, electric	16 x 20 x 14	--	--	--	Single	B	24,000	--
2	K155	K-6-1	Type A, class 1, style II, size C, 48 cup, gas	16 x 20 x 14	--	2.4	115	Single	C	--	--
			Type A, class 2, style II, size C, 48 cup, electric								

Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating*				Type Outlet	Type B.t.u. per hr.	Gas Lbs. per hr.	Steam
					HP	KW	Volts	Phase				
1	K228	K-8	Dishwashing machine, type II, model 50 SMT, steam	28 x 28	1	-	115	Three	M	--	35	
1	K241	K-8-1	Dishwashing machine, type IV, model 165 DA, steam	100 x 32	3	--	208	Three	M	--	60	
1	K245	K-8-2	Dishwashing machine, type IV, model 275 DA, steam	125 x 32	5	--	208	Three	M	--	70	
4	K270	K-40	Extractor, juice, electric			1/20	1/4				--	--
4	--	K-42	Frozen food cabinet, 8-10 cu. ft.	34 x 33 x 66		1/4	--				--	--
4	R610	K-42-1	Frozen food cabinet, 18-22 cu. ft.	47 x 36 x 73		1/3	--				--	--
2	K275	K-9	Fryer, deep fat, gas, H.D., size 1 (15 lbs.)	17 x 26 x 34	--	--	--				50,000	
2	K280	K-9-1	Fryer, deep fat, electric, H.D., size 35A (35 lbs.)	20 x 25 x 34	--	7.0	208	Single	E	--	--	
2	K285	K-9-2	Fryer, deep fat, gas, H.D., size 2 (75 lbs.)	21 x 30 x 34	--	--	--				75,000	
2	K290	K-9-3	Fryer, deep fat, electric, H.D., size 90A (90 lbs.)	26 x 38 x 34	--	18.0	208	Three	E	--	--	
2	K295	K-9-4	Fryer, deep fat, electric, H.D., size 60A (60 lbs.)	22 x 27 x 34	--	12.0	208	Single	E	--	--	
2	K970	K-35	Glass washing machine, electric	16 x 16 x 16	1/4	--	115	Single	A	--	--	
2	K310	K-10-1	Griddle, electric, type A, stand mounted	38 x 22 x 41-1/2	--	9.0	208	Single	D	--	--	
2	K315	K-10	Griddle, electric, type II: Size 1, table mounted	38 x 24 x 9	--	9.0	208	Single	D	--	--	
2	K320	K-10-2	Size 2, table mounted Griddle, gas, table mounted, counter type	26 x 22 x 9 35 x 18 x 10	--	6.0	208	Single	D	--	50,000	
4	K355	K-39	Hot plate--1-burner, electric	24 x 12 x 6	--	2.0	115	Single	C	--	--	
4	K350	K-39-1	Hot plate--2-burner, electric	24 x 12 x 6	--	2.4	115	Single	C	--	--	
4	K330	K-11	Machines: Chopping (grinding), meat, type II, class A, size 8	13 x 24 x 19	1/2	--	115	Single	A	--	--	
2	K325	K-11-1	Machines: Chopping (grinding), meat, type II, class A, size 20	19 x 32 x 25	1	--	208	Three	M	--	--	
2	K335	K-11-2	Machines: Chopping (grinding), meat, type II, class B, size 50	30 x 48 x 44	7-1/2	--	208	Three	M	--	--	
2	R460	X-50	Ice cube maker, electric, self- contained, 300 lbs/day	36 x 36	1/3	--	115	Single	A	--	--	
2	R480	X-55	Ice maker, solid flake and shaved, electric, self-contained, 1,000 lbs/day	36 x 36	3	--	208	Three	M	--	--	

Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating*						Steam Lbs. per hr.
					HP	KW	Volts	Phase	Type Outlet	Gas	
2	K375	K-12	Kettle, steam jacketed, steam, 20 gal.	20 Dia.	--	--	--	--	--	--	40
2	K370	K-12-1	Kettle, steam jacketed, gas fired, 20 gal.	25 Dia.	--	--	--	--	--	75,000	--
2	K385	K-12-2	Kettle, steam jacketed, steam, 40 gal.	26 Dia.	--	--	--	--	--	--	70
2	K380	K-12-3	Kettle, steam jacketed, gas fired, 40 gal.	31 Dia.	--	--	--	--	--	110,000	--
2	K400	K-12-4	Kettle, steam jacketed, steam, 60 gal.	30 Dia.	--	--	--	--	--	--	105
2	K395	K-12-5	Kettle, steam jacketed, gas fired, 60 gal.	35 Dia.	--	--	--	--	--	140,000	--
2	K365	K-12-8	Kettle, steam jacketed, trunnion, 5 gal. steam	16 Dia.	--	--	--	--	--	--	20
2	K377	K-12-9	Kettle, steam jacketed, trunnion, 20 gal. steam	20 Dia.	--	--	--	--	--	--	46
2	K390	K-12-10	Kettle, steam jacketed, trunnion, 40 gal. steam	26 Dia.	--	--	--	--	--	--	70
2	--	K-12-11	Kettle, steam jacketed, trunnion, 60 gal. steam	30 Dia.	--	--	--	--	--	--	105
2	K200	K-7	Machine, meat, bone and fish cutting, electric	36 x 36	1-1/2	--	208	Three	M	--	--
2	K510	K-16	Machine, vegetable peeling, size A, 15 lbs.	31 x 24	1/3	--	115	Single	A	--	--
2	K515	K-16-1	Machine, vegetable peeling, size B, 30 lbs.	40 x 30	3/4	--	115	Single	A	--	--
2	K520	K-16-2	Machine, vegetable peeling, size C, 50 lbs.	44 x 36	1	--	208	Three	M	--	--
4	K423	K-13-1	Machine, food mixing, electrically operated, vertical: Size 20, 20 qt. cap. table mounted	14 x 28	1/3	--	115	Single	A	--	--
2	K425	K-13-2	Size 30, 30 qt. cap. floor mounted	30 x 48	1/2	--	115	Single	A	--	--
2	K430	K-13-3	Size 60, 60 qt. cap. floor mounted	29 x 50	1	--	208	Three	M	--	--
2	K435	K-13-4	Size 80, 80 qt. cap. floor mounted	31 x 50	1-1/2	--	208	Three	M	--	--

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Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating*					Gas Btu. per hr.	Steam lbs. per hr
					HP	KW	Volts	Phase	Type Outlet		
4	K675	K-21	Machine, slicing, meat, type II, class B, table mounted	26 x 20 60 x 40 x 62	1/3	--	115	Single	A	--	--
2	K495	K-15	Oven, bake or roasting, 2 decks, w/removable shelves, gas	55 x 36 x 67	--	--	--	--	E	100,000	--
2	K460	K-15-1	Oven, cooking, deck, electric, 2 decks	31 x 41 x 66	--	--	--	--	E	--	--
2	K486	K-15-2	Oven, broiler and roasting, heavy duty, hotel type, gas	36 x 38 x 66	--	16	208	Three	E	66,000	--
2	K487	K-15-3	Oven, broiler and roasting, heavy duty, hotel type, electric	23-1/2 Dia. x 34	1/6	--	115	Single	M	--	--
1	K260	K-28	Preflushing machine for use with dishwashers	40 x 26	--	--	--	--	E	62,500	--
2	K560	K-17	Ranges, gas, domestic, table top, 4 burner	36 x 30	--	13	115/208	Single	D	--	--
2	K570	K-17-1	Ranges, electric, domestic, cabinet type, type I	32 x 36	--	--	--	--	E	100,000	--
2	K590	K-18-1	Ranges, gas, heavy duty, hotel type (try top)	32 x 36	--	--	--	--	E	90,000	--
2	K595	K-18-1	Ranges, gas, heavy duty, hotel type (hot top)	36 x 39	--	15	208	Three	E	--	--
2	K600	K-18-2	Ranges, electric, heavy duty, hotel type, type II, (try top)	36 x 39	--	21	208	Three	E	--	--
2	K605	K-18-2	Ranges, electric, heavy duty, hotel type, type I, (hot top)	36 x 39	--	21	208	Three	E	--	--
2	K607	K-18-2	Ranges, electric, heavy duty, hotel type, type III, (dual purpose)	33 x 27 x 67	1/4	--	115	Single	A	--	--
4	R700	K-19-1	Refrigerators, self-contained, type IV, size 12, electric	50 x 30 x 78	1/4	--	115	Single	A	--	--
4	R720	K-19-2	Refrigerators, self-contained, mech. cooled, electric US No. 20	66 x 34 x 78	1/2	--	115	Single	A	--	--
4	R740	K-19-3	Refrigerators, self-contained, mech. cooled, electric US No. 45	90 x 36 x 76	1/2	--	115	Single	A	--	--
4	R760	K-19-4	Refrigerators, self-contained, mech. cooled, electric US No. 65	96 x 96 x 94	1	--	208	Three	M	--	--
4	R860	K-20	Refrigerators, prefabricated, sectional, 320 cu. ft., 8' x 8'	(30 x 20 x 22)1	1-1/2	--	208	Three	M	--	--
4	R870	K-20-1	Refrigerators, prefabricated, sectional, 405 cu. ft., 8' x 10'	(30 x 22 x 26)1	--	--	--	--	--	--	--

*Compressor size

Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating					Gas	Steam
					HP	KW	Volts	Phase	Type Outlet		
4	R880	K-20-2	Refrigerator, prefabricated, sectional, 845 cu. ft., 16' x 10' 1-7' comp. and 1-9' comp.	192 x 120 x 94 (36 x 24 x 26) ¹	2	--	208	Three	M	--	--
4	R890	K-20-3	Refrigerator, prefabricated, sectional, 1,310 cu. ft., 24' x 10' 2-7' comp. and 1-10' comp.	288 x 120 x 94 (36 x 26 x 28) ¹	3	--	208	Three	M	--	--
4	R900	K-20-4	Refrigerator, prefabricated, sectional, 1,650 cu. ft., 30' x 10' 2-9' comp. and 1-12' comp.	360 x 120 x 94 (44 x 30 x 30) ¹	1 and 3	--	208	Three	M	--	--
2	K685	K-22	Cooker, steam, vert., pressure type I, size 6, 6 Bu., steam	37 x 32	--	--	--	--	--	--	104
2	K687	K-22-1	Cooker, steam, vert., pressure type I, size 4, 4 Bu., steam	37 x 32	--	--	--	--	--	--	75
2	K688	K-22-2	Cooker, steam, vert., pressure type II, size 4, 4 Bu., gas	37 x 32	--	--	--	--	--	--	72,000
2	K700	K-23	Stove, baker's, gas fired, heavy duty, hotel type	22 x 27	--	--	--	--	--	--	100,000
2	K695	K-23-1	Stove, baker's, coal or charcoal fired, heavy duty, hotel type	24 Dia. x 30	--	--	--	--	--	--	--
2	K705	K-23-2	Stove, baker's, electric, heavy duty, hotel type	12 x 24	--	4.8	208	Single	F	--	--
4	K810	K-24-1	Table, food preparation, type I, grade 1	72 x 36	--	--	--	--	--	--	--
4	K815	K-24-2	Table, food preparation, type I, grade 1	96 x 36	--	--	--	--	--	--	--
4	K817	K-24-1	Table, food preparation, type I, grade 3	72 x 36	--	--	--	--	--	--	--
4	K819	K-24-2	Table, food preparation, type I, grade 2	96 x 36	--	--	--	--	--	--	--
4	K820	K-24-1	Table, food preparation, type I, grade 3	72 x 36	--	--	--	--	--	--	--
4	K821	K-24-2	Table, food preparation, type I, grade 3	96 x 36	--	--	--	--	--	--	--
4	K725	K-24-3	Table, work, cook's, with pan rack, type II, Grade 1	72 x 36	--	--	--	--	--	--	--
4	K720	K-24-4	Table, work, cook's, with pan rack, type II, Grade 1	96 x 36	--	--	--	--	--	--	--
4	K726	K-24-3	Table, work, cook's, with pan rack, type II, Grade 3	72 x 36	--	--	--	--	--	--	--

¹Compressor size

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Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Ratings						
					HP	KW	Volts	Phase	Type Outlet	Gas B.t.u. per hr.	Steam Lbs. per hr.
4	K727	K-24-4	Table, work, cook's, with pan rack, type II, grade 3	96 x 36	--	--	--	--	--	--	--
4	K715	K-24-8	Table, baker's, w/ removable bins and drawers	72 x 30	--	--	--	--	--	--	--
4	K718	K-24-9	Table, baker's, w/ removable bins and drawers	96 x 30	--	--	--	--	--	--	--
1	K750	K-38	Steam table, commercial, heavy duty, size A, steam	64 x 27	--	--	--	--	--	--	22
1	K740	K-38	Steam table, commercial, heavy duty, size A, gas	64 x 27	--	--	--	--	--	34,000	--
1	K745	K-38	Steam table, commercial, heavy duty, size A, electric	64 x 27	--	5	208	Single	F	--	--
1	K765	K-38-1	Steam table, commercial, heavy duty, size B, steam	78 x 27	--	--	--	--	--	--	24
1	K755	K-38-1	Steam table, commercial, heavy duty, size B, gas	78 x 27	--	--	--	--	--	39,000	--
1	K760	K-38-1	Steam table, commercial, heavy duty, size B, electric	78 x 27	--	6	208	Single	F	--	--
1	K780	K-38-2	Steam table, commercial, heavy duty, size C, steam	92 x 27	--	--	--	--	--	--	28
1	K770	K-38-2	Steam table, commercial, heavy duty, size C, gas	92 x 27	--	--	--	--	--	52,000	--
1	K775	K-38-2	Steam table, commercial, heavy duty, size C, electric	92 x 27	--	6	208	Single	F	--	--
4	K825	K-25	Toaster, electric, pop-up, 200 slices per hour	12 x 18	--	2.4	115	Single	C	--	--
2	K830	K-25-2	Toaster, conveyor type, size 1, 360 slices per hour, type I, electric	16 x 18 x 28	1/20	2.64	115	Single	C	--	--
2	K835	K-25-1	Toaster, conveyor type, size 1, 360 slices per hour, type V, VI, VII and VIII, gas	16 x 18 x 28	1/20	--	115	Single	A	12,000	--
2	K840	K-25-4	Toaster, conveyor type, size 2, 540 slices per hour, type II, electric	21 x 18 x 28	1/20	3.6	115	Single	C	--	--
2	K845	K-25-3	Toaster, conveyor type, size 2, 540 slices per hour, type V, VI, VII and VIII, gas	21 x 18 x 28	1/20	--	115	Single	A	20,000	--

Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size - Inches	Rating*						
					Electrical			Gas			
HP	KW	Volts	Phase	Type	Bit.u. per hr.	Gas	Lbs. per hr.				
3	K920	K-26-3	Urn, coffee, type I, (steam) size 2, (twin 10 gals.)	27 x 33	--	--	--	--	--	--	110
3	K915	K-26-3	Urn, coffee, type II, (gas) size 2, (twin 10 gals.)	27 x 33	--	--	--	--	--	56,000	--
3	K910	K-26-3	Urn, coffee, type III, (electric) size 2, (twin 10 gals.)	27 x 33	--	11.25	208	Single	F	--	--
3	K925	K-26-4	Urn, coffee, type I, (steam) size 3, (twin 15 gals.)	29 x 34	--	--	--	--	--	--	166
3	K926	K-26-4	Urn, coffee, type II, (gas) size 3, (twin 15 gals.)	29 x 34	--	--	--	--	--	84,000	--
3	K927	K-26-4	Urn, coffee, type III, (electric) size 3, (twin 15 gals.)	29 x 34	--	13.5	208	Single	F	--	--
3	K928	K-26-5	Urn, coffee, type I, (steam) size 4, (battery 40 gals.)	96 x 42	--	--	--	--	--	--	200

Notes

- When gas is used as fuel, specify type of gas--natural, manufactured, or liquefied petroleum.
- Ranges: Specify number of hot top and fry top ranges.
- Joint schedule numbers represent symbols established for Army and Air Force medical facilities.
- Standard equipment voltage ratings are as follows: motors, single phase, 115 and 230 volts; motors, polyphase, 208 and 220 volts, heating elements, 115, 208 and 230 volts. Voltages selected above in schedule are based on the use of a 120/208-volt, three-phase wiring system. If a single phase, 115/230-volt or three-phase, 230-volt system is available at any specific project, standard voltage ratings for equipment should be selected to match these systems. The use of 230-volt, single phase motors on 208 volts should be avoided.

Type of electrical outlets

A--Duplex convenience. F--Junction box with flexible conduit connection to equipment.
 B--20A receptacle. M--Motor outlet.
 C--30A receptacle. Provide disconnect switch, when equipment is not in sight of panel
 D--50A receptacle and M
 E--Conduit connection stub, through floor.

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APPENDIX IV

BREAD-BAKERY-EQUIPMENT SCHEDULE

Class	Joint Schedule No.	Item No.	Item	Size Inches	Ratings					Gas B.t.u. per hr.	Lbs. per hr.	Steam
					Electrical			Phase	Type Outlet			
2	--	BB-3	Chilled water units for bakeries, type II: Combination ingredient and jacket water, 34C	Size 1 Size 2 Size 3 Size 4	3 5 7-1/2 10	-- -- -- --	208 208 208 208	Three Three Three Three	M M M M	-- -- -- --	--	
2	--	BB-3-1	Combination ingredient and jacket water, 70C									--
2	--	BB-3-2	Combination ingredient and jacket water, 106C									--
2	--	BB-3-3	Combination ingredient and jacket water, 120C									--
2	--	BB-4	Divider, with dough hopper, 150 lbs. cap., 2 pocket	36 x 71 x 54	1	--	208	Three	M	--	--	--
2	--	BB-4-1	Divider, with dough hopper, 200 lbs. cap., 4 pocket (less discharge conveyor)	43 x 71 x 54	2	--	208	Three	M	--	--	--
2	--	BB-5	Dough handling machinery: Dump bin, 200 lbs., revolving sifter, stationary hopper, 400 lbs., class 2	33 x 114 x 120	1-1/2	--	208	Three	M	--	--	--
2	--	BB-5-1	Dump bin, 600 lbs., revolving sifter, stationary hopper, 400 lbs., class 1, type II	36 x 63 x 154	3	--	208	Three	M	--	--	--
2	--	BB-5-2	Dump bin, 600 lbs., revolving sifter, traveling hopper, 400 lbs., class 1, type I	42 x 75 x 154	3	--	208	Three	M	--	--	--
2	--	BB-5-3	Dump bin, 600 lbs., revolving sifter, traveling hopper, 500 lbs., class 1, type I	42 x 75 x 154	3	--	208	Three	M	--	--	--
<u>Note. All three units. Maximum height to top of sifter, 12'-6". Provide headroom for elevator to 14'-0".</u>												
2	--	BB-6	Flour sifter, elevator, bin and chute Machine, dough mixing, horiz. (water jacketed): 1 bbl. size, 360 lbs./batch, electric 1-1/2 bbl. size, 540 lbs./batch, electric	33 x 114 x 120 max.	3/4	--	115	Single	A	--	--	--
2	--	BB-7-1		39 x 70 x 68	10	--	208	Three	M	--	--	--
2	--	BB-7-2		39 x 74 x 71	15	--	208	Three	M	--	--	--

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Bread-Bakery-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating*				Type Outlet	Gas B.t.u. per hr.	Steam Lbs. per hr.
					HP	KW	Volts	Phase			
2	--	BB-7-3	2 bbl. size, 720 lbs./batch, electric	41 x 80 x 80	20	--	208	Three	M	--	--
2	--	BB-7-4	2-1/2 bbl size, 900 lbs./batch, electric	55 x 88 x 87	25	--	208	Three	M	--	--
2	--	BB-7-5	3 bbl. size, 1000 lbs./batch, electric	58 x 95 x 87	30	--	208	Three	M	--	--
4	--	BB-8	Machine, pan greasing	25 x 52	1/4	--	115	Single	A	--	--
4	--	BB-9	Machine, bread, slicing and wrapping: Gravity feed, hand wrapping, 600 loaves per hr.	24 x 48 x 48	1/3	--	115	Single	A	--	--
2	--	BB-9-1	Power feed, automatic wrapping, 1500 loaves per hr.	178 x 45 x 48	7-1/2	--	208	Three	M	--	--
2	--	BB-10	Meter, water, 300 lbs. per min	12 x 25 x 26	--	--	--	--	--	--	--
2	--	BB-10-1	Meter, water, 500 lbs. per min.	12 x 25 x 26	--	--	--	--	--	--	--
2	--	BB-11	Moulder, heavy duty, 22 and 36 oz pieces, electric	40 x 75 x 60	2	--	208	Three	M	--	--
2	--	PB-3	Ovens, revolving tray, 4 or 5 trays, gas or oil	143 x 110 x 111	1/3 and 1/4	--	115	Single	A	210,000	80
2	--	PB-3-1	Ovens, revolving tray, 5 or 6 trays, gas or oil	161 x 110 x 111	1/3 and 1/4	--	115	Single	A	240,000	120
2	--	BB-12	Ovens, traveling tray, 10 trays, gas	156 x 168 x 198	2	--	208	Three	M	660,000	138
2	--	BB-12-1	Ovens, traveling tray, 16 trays, gas	156 x 240 x 198	8	--	208	Three	M	825,000	450
2	--	BB-12-2	Ovens, traveling tray, 18 trays, gas (Vent to outside atmosphere)	156 x 276 x 198	10	--	208	Three	M	900,000	500
2	--	BR-13	Proofer, intermediate, 350 active tray pockets	51 x 264 x 156	1-1/2	--	208	Three	M	--	--
2	--	BB-13-1	Proofer, intermediate, 450 active tray pockets	51 x 265 x 156	2	--	208	Three	M	--	--
2	--	BB-13-2	Proofer, intermediate, 540 active tray pockets	51 x 325 x 156	2	--	208	Three	M	--	--
2	--	BB-13-3	Proofer, intermediate, 600 active tray pockets	51 x 380 x 156	2	--	208	Three	M	--	--
2	--	BB-14	Proofer, revolving cabinet and proofer 360 loaves, portable	60 x 60 x 60	--	--	--	--	--	--	--

Bread-Bakery-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Ratings					Steam Lbs. per hr.
					HP	KW	Volts	Phase	Type Outlet	
2	--	BB-14-1	Proofer, revolving cabinet and proofer. 600 loaves, portable. (Based on 1-1/4 lb. loaves)	60 x 72 x 48	--	--	--	--	--	--
4	R720	K-19-2	Refrigerators, self-contained. 20 cu. ft.	50 x 30 x 76	1/4	--	115	Single	M	--
4	R760	K-19-4	Refrigerators, self-contained. 65 cu. ft.	90 x 36 x 78	1/2	--	115	Single	M	--
		BB-15	Rounders, dough, heavy duty. 60 pieces per min.	38 x 24 x 50	2	--	208	Three	M	--

Type of electrical outlets

Notes

1. When gas is used as fuel, specify type of gas--natural, manufactured, or liquefied petroleum.
2. Joint schedule numbers, where used, represent symbols established for Army and Air Force medical facilities.
3. Standard equipment voltage ratings are as follows: motors, single phase, 115 and 230 volts; motors, polyphase, 208 and 220 volts; heating elements, 115, 208 and 230 volts. Voltages selected above in schedule are based on the use of a 120/208-volt, three-phase wiring system. If a single phase, 115/230-volt, three-phase, 230-volt system is available at any specific project, standard voltage ratings for equipment should be selected to match these systems. The use of 230-volt, single phase motors on 208 volts should be avoided.

A--Duplex convenience.
B--20A receptacle.
C--30A receptacle.
D--50A receptacle.
E--Conduit connection stub, through floor.
F--Junction box with flexible conduit connection to equipment.
M--Motor outlet.
Provide disconnect switch, when equipment is not in sight of panel supplying power, for outlets F and M.

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APPENDIX V

PASTRY-KITCHEN-EQUIPMENT SCHEDULE

Class	Joint Schedule No.	Item No.	Item	Size Inches	Rating*				Gas B.t.u. per hr.	Steam Lbs. per hr.
					HP	KW	Volt	Phase		
2	--	PB-1	Chilled water units for bakeries, type I: Ingredient water cooler, 20 gal. per hr.	Size A	1	--	208	Three	M	--
2	--	PB-1-1	Ingredient water cooler, 30 gal. per hr.	Size B	1-1/2	--	208	Three	M	--
4	K263	PB-8	Dough divider, roll, 36 part, type 1	15 x 19	--	--	--	--	--	--
2	--	PB-8-1	Dough divider, roll, electric, 36 part, type II	24 x 33	1/2	--	115	Single	A	--
2	K285	K-9-2	Fryer, deep fat, gas, H.D., size 2 (75 lb.)	21 x 30 x 34	--	--	--	--	75,000	--
2	K290	K-9-3	Fryer, deep fat, electric, H.D., size 90 (90 lb.)	26 x 38 x 34	--	18	208	Three	E	--
2	K377	K-12-9	Kettle, steam jacketed, trunnion, 20 gal.	20 Dia.	--	--	--	--	--	40
2	K390	K-12-10	Kettle, steam jacketed, trunnion, 40 gal.	26 Dia.	--	--	--	--	--	70
2	--	K-12-11	Kettle, steam jacketed, trunnion, 60 gal.	30 Dia.	--	--	--	--	--	:05
2	--	PB-19	Machine, cookie cutting, electric	48 x 28 x 48	1/4	--	115	Single	E	--
2	--	PB-2	Machine, doughnut, electric, 80 doz. per hr. ¹	28 x 28 x 60	1/4	8.8	208	Three	E	--
2	--	PB-2	Machine, doughnut, gas, 200 doz. per hr. ¹	142 x 20 x 50	1/2 and 1/10	--	--	Single	A	150,000
2	--	PB-2	Machine, doughnut, electric, 200 doz. per hr. ¹	142 x 20 x 50	1/2 and 1/10	23.9	208	Three	E	--
2	--	PB-2	Machine, doughnut, gas, 400 doz. per hr. ¹	142 x 27 x 50	1/2 and 1/10	--	--	Single	A	250,000
2	--	PB-2	Machine, doughnut, electric, 400 per hr. ¹	142 x 27 x 50	1/2 and 1/10	34.9	208	Three	E	--
2	K435	K-13-4	Machine, food mixing, size 80	31 x 50	1-1/2	--	208	Three	M	--
2	--	K-13-5	Machine, food mixing, size 140	31 x 50	3	--	208	Three	M	--
4	--	PB-20	Opener, can, electric		1/20	--	115	Single	A	--
2	--	PB-15	Oven, bake, 3 deck, gas	60 x 47 x 78	--	--	--	--	--	130,000
2	--	PB-15-1	Oven, bake, 3 deck, electric	57 x 64 x 74	--	22.5	208	Three	E	--
2	--	PB-3	Oven, revolving tray, 4 or 5 tray, gas or oil	143 x 110 x 111	1/3 and 1/4	--	115	Single	A	210,000

¹ Vent to outside atmosphere

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Pastry-Kitchen-Equipment Schedule - continued

Class	Joint Schedule No.	Item No.	Item	Size Inches	Ratings					Gas Btu per hr.	Steam Lbs per hr.
					HP	KW	Volts	Phase	Type Outlet		
2	--	PB-3-1	Oven, revolving tray, 5 or 6 trays, gas or oil	161 x 110 x 111 1/3 and 1/4	--	115	Single	A	210,000	120	--
4	K530	PB-4	Proof box, bun pan, portable, w/humidifier	23 x 34 x 76	66	115	Single	E	--	--	--
2	--	PB-5	Proof box, rack type, 2 racks, steam	72 x 74 x 78	--	--	--	--	--	--	18
2	--	PB-5-1	Proof box, rack type, 3 racks, steam	108 x 74 x 78	--	--	--	--	--	--	27
4	--	PB-6	Rack, bread and proof	29 x 70 x 72	--	--	--	--	--	--	--
4	--	PB-7	Rack, cooling, doughnut	29 x 35 x 67	--	--	--	--	--	--	--
4	R760	K-19-4	Refrigerator, mechanical, commercial, reach in, self-contained, size U.S. 65	96 x 36 x 78	1/2	--	115	Single	A	--	--
4	--	PB-9	Roller, pie dough, bench type	26 x 30 x 14	1/2 and 1/3	--	115	Single	A	--	--
4	--	PB-10	Scale, weighing, baker's, 5 lb. cap.	8 x 20 x 16	--	--	--	--	--	--	--
4	--	PB-11	Scale, weighing, ingredient, 115 lb. cap. (Dial graduation to 75 lbs.)	17 x 19 x 17	--	--	--	--	--	--	--
4	--	PB-12	Sifter, flour	21 Dia.	1/8 and 1/4	--	115	Single	A	--	--
4	K670	PB-13	Skid, platform	36 x 54 x 9	--	--	--	--	--	--	--
4	K680	PB-14	Stand, mixer bowl, portable	24 D x 28 H	--	--	--	--	--	--	--
2	K700	K-23	Stove, baker's, gas fired	24-1/2 D x 26 H	--	--	--	--	--	94,100	--
2	K695	K-23-1	Stove, baker's, coal or charcoal	24 D x 30 H	--	--	--	--	--	--	--
2	K705	K-23-2	Stove, baker's, electric	12 x 24	--	4.8	208	Single	F	--	--
4	--	K-24-1	Table, work, kitchen	36 x 72	--	--	--	--	--	--	--
4	--	K-24-2	Table, work, kitchen	36 x 96	--	--	--	--	--	--	--
4	--	PB-16	Trough, dough, 4 feet	29 x 51 x 26	--	--	--	--	--	--	--
4	--	PB-17	Truck, flour skid, 2,500 lbs. cap.	27 x 48 x 62	--	--	--	--	--	--	--
4	--	PB-18	Truck, pan, baker's, platform type	24 x 48	--	--	--	--	--	--	--

Pastry-Kitchen-Equipment Schedule - continued

<u>Notes</u>	<u>Type of electrical outlets</u>
1. When gas is used as fuel, specify type of gas--natural, manufactured or liquefied petroleum.	A--Duplex convenience. F--Junction box with flexible conduit connection to equipment.
2. Joint schedule numbers, where used, represent symbols established for Army and Air Force medical facilities.	B--20A receptacle. C--30A receptacle. M--Motor outlet.
3. Standard equipment voltage ratings are as follows: motors, single phase, 115 and 230 volts; motors, polyphase, 208 and 220 volts; heating elements, 115, 208 and 230 volts. Voltages selected above in schedule are based on the use of a 120/208-volt, three-phase wiring system. If a single phase, 115/230-or three-phase, 230-volt system is available at any specific project, standard voltage ratings for equipment should be selected to match these systems. The use of 230-volt, single phase motors on 208 volts should be avoided.	D--50A receptacle. E--Conduit connection stub, through floor. Provide disconnect switch, when equipment is not in sight of panel supplying power, for outlets F and M.